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BETWEEN AUTONOMY AND ENGAGEMENT

INTERPRETING AND PRACTISING KNOWLEDGE EXCHANGE IN UK ACADEMIA

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Declaration

I, Justyna Bandola-Gill, declare that this thesis has been composed solely by myself and that it has not been submitted, in whole or in part, in any previous application for a degree. Except where states otherwise by reference or acknowledgment, the work presented is entirely my own. Parts of the literature review in Chapter 3 are based on a book chapter from a Handbook of Policy Formulation with a permission from Elgar Publishing. The publication is presented in Appendix.

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Abstract

Scholarly interest in "impact" - the focus on the social and economic relevance of science as a research assessment criterion - has been steadily rising in UK academia since the early 1990s. In this context, knowledge exchange between researchers and policymakers has become increasingly incentivised by funders and universities. Building on theories from STS, evidence-policy relations and organisation studies, this PhD thesis explores the cultural and institutional determinants of the changing relationship between science and policy over the last thirty years. The thesis employs the concept of *institutional logics* to examine the broader implications of these changes, arguing that the so-called "research impact agenda" has resulted in the emergence of new practices in UK academia. In this work I identify and define two main logics that both co-exist and compete: the *logic of excellence*, which views science as intellectually driven and underpinned by the freedom of inquiry of academics, and the newly emerged *logic of impact*, which is problem-driven and assumes high levels of engagement with research users for the purpose of solving policy relevant problems.

The empirical foundations of this thesis rest on two case studies of publicly-funded knowledge exchange organisations: the ESRC Genomics Policy & Research Forum and Fuse – the Centre for Translational Research in Public Health. Based on 51 in-depth semi-structured interviews with academics and policymakers engaged with these two organisations, plus an analysis of over 80 documents (including research funding policy statements and case study organisations' strategies and reports), this thesis offers insights into the academics' responses to the dual logics shaping contemporary academia.

This thesis argues that this paradigmatic pluralism poses a particularly acute challenge for academics engaged in knowledge exchange organisations who perceive themselves to be guided by contradictory expectations and incentive systems. In particular, three areas of contestation of these logics are foregrounded: i) academic knowledge practices including producing academic research, translating research and producing policy research; ii) various framings of knowledge exchange employed by academics, including viewing it as challenging policy frameworks, facilitating learning, producing usable evidence, or advocating for specific policy options; and iii) practices of

boundary work between science and policy in terms of both blurring existing boundaries and setting new ones.

Establishing hybridity between different logics within designated knowledge exchange spaces involves a rhetorical, material and structural process of navigating these multiple framings of knowledge exchange, research practices and boundary work. Through employing such diverse framings and practices, the interviewees aimed to secure legitimacy in the eyes of both policy audiences and fellow academics by variously positioning themselves as both relevant to the policymaking process and independent from it. This thesis argues that the authority of science in knowledge exchange processes and its effectiveness at contributing to policy change stem neither from the close engagement of academics with the political context nor from complete autonomy from such setting, but rather it is grounded in an ability to constantly negotiate the two. To understand this persistent institutional and cultural duality, this thesis proposes we should understand science and policy as symbiotically intertwined but nonetheless distinguishable from one another.

Table of Contents

List of Tables

List of Figures

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CHAPTER 1

INTRODUCTION THE AUTHORITY AND ACCOUNTABILITY OF SCIENCE

It is also a question of improving the focus, relevance and timeliness of research, making it more accessible and intelligible to users, ensuring the research funding processes encourage this, and breaking down the barriers of mutual suspicion between social researchers and those in government.

David Blunkett
Speech to the ESRC, 2000

Any attempt at guiding scientific research towards a purpose other than its own is an attempt to deflect it from the advancement of science.

Michael Polanyi
The Republic of Science, Minerva (1)1962 p.9

1.1. THE DIMINISHING DISTANCE BETWEEN SCIENCE AND POLICY

The importance of science in the contemporary world is evident – it is relied upon to cure epidemic outbreaks, improve agriculture or ameliorate the effects of climate change. And yet, the manner in which science is to achieve these goals is not unequivocal. This problem is illustrated by the two quotes presented above: the distance between science and society is expected to diminish in order for science to be useful in facing these grand challenges, and yet - an excessive intervention in the independence of science poses a risk to both the quality and authority of science. This thesis aims to untangle this paradox by problematising the notions of science's autonomy and engagement in the context of knowledge exchange and brokering between academics and policymakers/practitioners.

The calls for increased engagement between science and policy – progressively central to research funding – originate in two different narratives, reflecting a problematic status of science in contemporary society. On the one hand, the science is expected to be closely embedded in policy faced with "wicked problems" (Crowley & Head, 2017; Thiele & Young, 2016). These emerging challenges are not solvable purely on the basis of science but instead require the participation of multiple stakeholders (Fischer, 2009; in 't Veld, 2010; Jasanoff, 2003c). Therefore, the proposed solution to the increasing complexity of contemporary policy problems is to change the structural setting of science (Turnhout et al., 2013) – science has to be "opened up" (Stirling, 2008; Wynne, 2007) to accommodate multiple value systems, meanings and forms of knowledge and expertise. Some scholars (Gibbons et al., 1994; Rip, 2002, 2004) go as far as to argue that these new problems require a new type of science to solve the emerging challenges, as the traditional academic structures are not adequate to face these challenges.

On the other hand, the second narrative of the diminishing distance between science and society is grounded in the erosion of science's unquestioned position of authority. Many scholars have discussed the public failures of science (Jasanoff, 1997) or the "death of expertise" (Nichols, 2017) as emblematic of this change in status. There is another - and more subtle - sign of this change: science's value is no longer taken for granted, but rather has to be demonstrated to the wider society. This is what Nowotny et al. (2001) called a transition towards a "culture of accountability", replacing scientific autonomy as the main axiom of science's value. The expectation of engagement between researchers and research users as a means of assuring the use of scientific research is increasingly becoming one of the tenets of the funding and regulation of science (Hessels, van Lente, & Smits, 2009; Jacob, 2006a, 2006b). Hence, the notion of the accountability of science in this vein of inquiry is closely coupled with social embeddedness and participation of research users in the quality assessment of produced knowledge (Nowotny et al., 2001).

These debates over the diminishing distance between science and society are not purely conceptual, as they were followed up by a multiplicity of changes in research funding. Over the last few decades – as a result of the so-called impact agenda – the UK research funding system has undergone a paradigmatic-level change.

Consequently, the public funding of science in the UK is much more dependent on the broader social and economic benefits that the research yields (Martin, 2011; Smith, Ward, & House, 2011). The scale of this transformation is extensive and encompasses both legs of the dual-funding system[1] which now include the notion of "research impact" as a measurement of quality of research either ex-ante in grant applications[2] or ex-post as an element of performance assessment within the Research Excellence Framework (REF, 2011b). Furthermore, this increasing focus on research impact has been accompanied by the emergence of knowledge exchange and cognate practices (e.g. public engagement or academic entrepreneurship) as among the institutionalised areas of academic activity garnering multiple sources of funding (HEFCE, 2016). Perhaps unsurprisingly, considering the studies in sociology and history of scientific knowledge over the last few decades (Calvert, 2006; Clarke, 2010; Gieryn, 1983; Hellstrom & Jacob, 2000; Jasanoff, 1987), these initiatives – aimed at making science more useful for solving society's challenges and increasing the public accountability of science – have been widely criticised for the very qualities that supposedly make them effective. The research impact agenda met with considerable opposition from academics, who often saw it as an attack on the autonomy of science and freedom of inquiry (Colley, 2014; Murphy & Sage, 2014; Watermeyer, 2016).

Such opposition, even if not new, is emblematic of a deeper struggle over the sources of cognitive authority of science (Hoppe, 2005; Turner, 2001). The strict boundary between science and policy was the traditional source of such authority; hence the calls for social accountability of research and embedding science in context pose an important challenge to the existing structures of knowledge and power. As such, the research impact agenda goes beyond just rearranging the organisation and governance of knowledge production (for example via research funding); it also – and perhaps more importantly – influences the grounds for the expertise of academics (cf. Jasanoff, 2010; Pestre 2003). This juxtaposition between different modes of authority is clearly illustrated by Sundqvist et al.'s (2015; 2017) categorisation of debates on the

[1] "Dual-funding" system refers to the current structure of the UK funding structures in which research funding is provided via two routes: block funding disseminated to institutions based on a research quality exercise by the Funding Councils and project funding managed by the Research Councils (Hughes, A., Kitson, M., Bullock, A., & Milner, I., 2013)

[2] See: https://www.ukri.org/innovation/excellence-with-impact/pathways-to-impact/ [accessed: 27.08.2018]

applicability of science in environmental policy into two ideal-type models: the separation of policy and science, and the integration of the two.

The central underlying assumption of the separation model is that the authority of science stems from its autonomy and impartiality in relation to particular political considerations. This model is most closely aligned with the idea of "speaking truth to power" (Price, 1968; Wildavsky, 1979). The understanding of the science-policy relationship within this model assumes a clear separation between science producing "truth" and policymaking exerting "power". As the strength of science lies in its ability to construct "truth" in the form of scientific facts, the separation approach, therefore, sees the academic rigour and authority of science as closely intertwined (Sundqvist et al., 2017; Sundqvist et al., 2015; Jasanoff, 2005). Separation models, however, have been criticised for multiple reasons. One important critique is grounded in knowledge exchange and translation literature (Contrandriopoulos et al., 2010; Mitton et al., 2007; Oliver et al., 2014). This strand of literature points out that direct engagement with policymakers and adaptation of evidence to the policymakers' needs are key aspects of the successful uptake of knowledge in policy. Therefore, the effectiveness of separation models for achieving policy change might be contestable.

By contrast, the integration models assume that the value of science stems from its embeddedness in society (Bijker, Bal, & Hendriks, 2009). The supposition behind this model is that science is effective in policy when it is closely aligned with users' needs (Gibbons et al., 1994). These models assume a close collaboration between academics and policymaking actors, allowing for contextualised consideration of the best evidence – or production of evidence in the context of application (Gibbons et al., 1994; Nowotny et al., 2001). By engaging a broader range of actors, these approaches have the potential to achieve greater transparency regarding normative presumptions of knowledge which have thus far been veiled in the garb of the objectivity of scientific facts (Jasanoff, 1990, 2003). Therefore, the main source of authority moves from objectivity of knowledge (for example as projected via standardised scientific practice) towards its applicability for solving policy problems and its wider social legitimacy (Nowotny et al., 2001).

These two models of the science-policy relationship point to the paradoxical standing of science in policy, whereby science's usefulness in policy is based on contradictory

sets of groundings. By focusing on the contrast between these two models, the existing literature predominantly presents a story of tension between autonomy (embodying technocracy and objectivity) and engagement (embodying integrative, democratic and social-political models of credibility). And such a story lends itself to a focus on contrast or evolution, rather than on co-existence of different regimes of epistemic governance. This leads in turn to an emphasis on the differences between divergent values, approaches and processes without explaining how these two contrasting guiding rationalities might interact with each other. Consequently, the basis of academic credibility and authority in this increasingly integrated environment is underexplored, as understanding of the co-existence of the separation and integration models is lacking.

1.2. THE RESEARCH PUZZLE

The findings presented in this thesis challenge the duality of integration and separation models by exploring particular spaces dedicated to knowledge exchange, seen as sites where science and policy are directly engaging. The starting point of the empirical exploration and theoretical argument presented here consists of a puzzle: *science is perceived to be useful to policy problems on grounds both of being close to policy and being autonomous from it*. This puzzle is explored through two empirical sites, consisting of knowledge broker organisations funded by public funders and located at UK universities. The cases are presented in Section 1.4.

The tension between the autonomy and embeddedness of science in policy is often treated as an anomaly, a problem or a political game, rather than as the core component of knowledge exchange practices or a phenomenon in its own right. The existing literature presents two dominant explanations of this dualism between engagement and autonomy: one assuming the evolutionary approach to the science and society relationship, and one looking at the rhetorical strategies of actors involved in the science-policy interaction (see also: Sundqvist et al., 2015; 2017). The evolutionary approaches, expressed for example in the new modes of knowledge production (see also: Hessels & van Lente, 2008), view the progression of the relationship between science and society as a journey from the separation of "traditional" science to integration of the new modes of knowledge production. As the new models emerge to

replace traditional science (at least in some areas of challenging societal problems), the two models inevitably co-exist. Therefore, as explained by the evolutionary narrative, the co-existence of integration and separation is a result of the evolution of science structures which, at least in some areas of academic life, is an intermediary phase.

The second explanation approaches the problem of simultaneous autonomy and embeddedness of science as a rhetorical strategy aimed at yielding the influence and legitimacy of experts working in policymaking (Sundqvist et al., 2015; 2017). These approaches, by employing a micro-level perspective focusing on individual practices, present the tension between separation and integration models in terms of strategic and political work that experts in policy employ to achieve a balance between being too far from the policymakers to have influence, and being too close to maintain scientific authority. Here, an often-employed strategy is to adapt Goffman's (1956) frontstage–backstage approach (Bijker et al., 2009; Hilgartner, 2000; Jasanoff, 1990). In this view, experts navigate their relationship with policymakers, drawing on either separation or integration, to achieve specific goals, namely credibility stemming from scientific authority (frontstage) and effective work in producing knowledge that, goes beyond science, (backstage) but rather "combines elements of scientific evidence and reasoning with large doses of social and political judgement" (Jasanoff, 1990, p. 229).

These two explanations explore the puzzle from different analytical standpoints and levels of analysis and will be further discussed in subsequent chapters. However, one problem that these two explanations fail to account for is the pervasiveness and mechanics of the co-existence of these contradictory models. This paradoxical co-existence is persistent and penetrates multiple bodies of literature on science policy and evidence-based policymaking; moreover, in practice this co-existence has not only a rhetorical dimension but is also material (guiding rules and resources), structural (guiding institutional and organisational design), and cultural (as expressed in evolving values and practices).

This thesis aims to address this shortcoming by looking at an area where the separation and integration models seem to be particularly prominent – in university-based knowledge exchange. By doing so, this work advances the debates on the relationship between science and society/policy by unpacking and problematising the notions of

both "integration" and "separation" and the relationship between the two. This puzzle underpins the empirical exploration which is guided by the main research question:

How do academics reconcile the expectations of objectivity and relevance within interactions with non-academics?

The thesis provides rich empirical data exploring experiences, meaning-making processes and practices of actors involved in knowledge exchange activities who navigate the tension between the separation and integration of science and policy in their everyday work.

This general question is explored in the specific setting of knowledge exchange organisations. Hence, the thesis focuses on three substantive questions, exploring the specificity of the empirical site of this study. These three further questions reflect an interpretivist outlook and focus on the practices and sense-making processes of actors which are central to this thesis:

1. *How do academics make sense of knowledge exchange roles and practices?*
2. *How do academics accommodate knowledge exchange practices alongside more traditional academic work?*
3. *Within designated knowledge exchange spaces, how has a focus on knowledge exchange and impact shaped interactions between academics and policymakers?*

Therefore, by exploring the way science and policy interact in knowledge exchange organisations, this thesis explores the specific (academic) practices and boundary work that are central to this setting.

Before moving on to situate the thesis in the broader literature, this section will conclude with a brief discussion of terminology. As I will illustrate in Chapter 3, the literature does not always differentiate between such terms as "knowledge", "evidence" or "science", making it difficult to identify the key differences between these terms. The problem lies partly in the fact that the boundaries between these concepts are very much blurred. In this thesis I use the term "science" (understood as both natural and social science) predominantly to indicate a focus on academic

practices and their broader determinants. Therefore, science here includes all the epistemic, practical, cultural and institutional aspects of knowledge production within academic structures. At times, however, this thesis will also discuss "evidence" and "knowledge" as products of these academic practices.

1.3. SITUATING THE THESIS

So far, this chapter has outlined the main research problem this thesis aims to address (the decreasing distance between science and policy and its implications and the changing nature of authority of experts in policy). By exploring this problem, this thesis aims to make a contribution to scholarship on knowledge, science and policy. It is – just like this literature itself – interdisciplinary in its scope, drawing on multiple bodies of scholarship, including Science and Technology Studies (STS), science policy, policy studies and institutional and organisational studies. Nevertheless, the research puzzle outlined in the preceding sections has its intellectual underpinnings in STS scholarship, and the interdisciplinary discussions presented in – and hopefully initiated by – this work will present ways in which STS concepts might inform some of the ongoing debates over evidence-based policymaking, knowledge exchange and impact.

Theoretically, this thesis builds on the insights stemming from Sheila Jasanoff's (2004) work on the co-production of knowledge and social order. Scholarship in STS over the last few decades has shown that production, acceptance and contestation of knowledge are in fact political processes, although not in the sense that politics is understood in policy (Voss & Freeman, 2016). The idiom of co-production sees science and policy as mutually constitutive, both being socially constructed phenomena:

> Scientific knowledge, in particular, is not a transcendent mirror of reality. It both embeds and is embedded in social practices, identities, norms, conventions, discourses, instruments and institutions – in short, in all the building blocks of what we term social. (Jasanoff, 2004 p. 3)

In other words, the idiom of co-production assumes a close link between the understanding of social reality and the ways it is governed. Therefore – akin to other post-structural approaches – it calls for a closer examination of knowledge production

practices which enable understanding and actions (Lövbrand, 2007; Miller & Rose, 2008).

Two concepts – seen through the lens of the co-production idiom – are of particular relevance here: expertise and boundary work. The theoretical starting point of this thesis, drawing on extensive STS scholarship (Arnoldi, 2007; Grundmann & Stehr, 2012; Jasanoff, 2003b; Nelkin, 1975) is an assumption that expertise is attributional and shaped by the cultural and institutional context, with boundary work playing a central role in this process of projecting authority. One of the potential contributions of STS to research on evidence-based policymaking might be (following notable examples, e.g. Bartley, 1992; Boswell, 2017; Grek, 2014; Smith, 2013a) an in-depth exploration of the ways in which expert status and authority are assigned and mobilised. Expertise, analysed as a sociological phenomenon, cannot be reduced to formal skills or training, but rather is an attribute signalled by the broader environment – including institutions and power structures (Epstein, 1995; Wynne, 1992). Therefore, an exploration of the evolving notions of credibility and authority of experts resulting from the proliferation of calls for engagement between academia and policy cannot be complete without an investigation of the ways these new emerging funding paradigms and investments shape the institutions of knowledge production.

Here, STS insights into fluid meanings of institutionalised and encultured expertise benefit from the new institutionalist (DiMaggio & Powell, 1983; Friedland & Alford, 1991; Powell & DiMaggio, 1991) perspective on the way institutions create and transfer meaning and through it create social orders. Focusing on the micro foundations of the "inhabited institutions" (Binder, 2007; Hallett & Ventresca, 2006) of academia, draws attention to the issue of practices (guiding the focus of Chapter 5) as well as framings and identities (explored in Chapter 6) as means through which academics make sense of and enact the changes in science funding in their everyday work.

Positioning the PhD across these three areas of research - studies of expertise, boundary work and institutions - has opened up opportunities for making important contributions to the understanding of science-policy interactions. One key contribution of this thesis is a symbiotic model of the two which argues that, due to various

epistemic, institutional and cultural factors, science and policy are inseparable but nonetheless distinguishable from one another. Therefore, the authority and credibility of experts do not stem either from integration of science and policy or separation of the two, but rather is constructed through a complex process of balancing these concepts.

This process of navigating competing expectations of impartiality and close engagement relies upon practices which could be described as the "politics of engagement". As part of this process, academics not only have to navigate multiple institutional forces, validating and invalidating different sets of practices (for example, producing knowledge that is both academically excellent and practically applicable), but must also engage in a process of rhetorically expanding the content of such terms as "impartiality" or "autonomy" in order to appropriate them to the new institutional context where they are expected to produce academically excellent research as well as impact on non-academic audiences. One key attribute of this form of lending epistemic authority is its bounded portability (Jasanoff, 2004; Star & Griesemer, 1989). The boundaries to authority are set by both the policymakers – who limit access to "politics" of the process of decision-making - as well as academics who restrict the meaning of "excellent" research.

1.4. THE EMPIRICAL SITES: KNOWLEDGE EXCHANGE ORGANISATIONS

The preceding sections have outlined the main puzzle and research questions, as well as the conceptual framework and contributions of the thesis. The remaining part of this chapter will focus on the empirical sites of the research, the two case study organisations – the Genomics Forum and Fuse. It will begin by outlining the funding background, and particularly the research councils' rationales for supporting these types of knowledge exchange initiatives. This section will go on to explore the two case studies – their historical context, strategies and illustrative examples of achieved impact. The overall aim of this section is to prepare the ground for more in-depth exploration of the meanings and practices assigned to knowledge exchange by the academics involved in knowledge broker organisations.

1.4.1. Research funders' approach to knowledge exchange and brokering

This thesis focuses on two case studies of knowledge exchange-oriented organisations that were financed by public funders to be established within academic (university) settings. The establishment of the two organisations might be seen in the context of wider trends towards incentivising social and economic benefits of science by the research funders. The vast majority of research councils in the UK since the early 2000s have started to promote the ideas of translation of research across different settings and partnership working by offering a variety of funding schemes targeted at different forms of knowledge exchange and brokering (ESRC, 2005, 2006a, 2006b). At the same time, the implementation of the concept of the "knowledge broker" into the research funding context has resulted in the creation of specific forms of brokering entities. The knowledge brokers funded by the research councils mostly consisted of academics and were located at universities, and hence were still embedded in academic discourses and practices.

The rationale for funding knowledge brokers or knowledge intermediaries was that it supported the generation of impact stemming from research. For example, the ESRC, in its review "Taking stock. A summary of ESRC's (2009) work to evaluate the impact of research on Policy and Practice" , discussed knowledge brokers as among the factors supporting the achievement of impact, relationships with networks and communities, research user involvement, engagement and knowledge exchange strategies, good reputation and research infrastructure (ESRC, 2009, p. 14). This document describes knowledge brokers as "translators, amplifiers, network providers" (ibidem). These posts were seen as entities that "can and do facilitate impact on behalf of individual researchers who would not otherwise have access to the necessary resources and infrastructure" (ibidem). This conceptualisation of knowledge brokerage has resulted in funding provided for a variety of initiatives on both the individual and the organisational levels, aimed at navigating and translating research in different social settings (for example: the Placement Fellowships (ESRC, 2005, 2006b))

As the skills initially assigned to knowledge brokers became increasingly identified as central to academia in general (a development addressed in detail in Chapter 2), the funding for different initiatives evolved. The conceptualisation of the intermediary

organisations moved on from the idea of "working on behalf" of academics to working in partnership with research users and co-producing knowledge. Therefore, the new forms of intermediary organisation are explicitly charged with not only translating but also producing relevant research. And progressively, the concept of a knowledge/research broker has been replaced by that of "partnership" work. There are multiple different funding schemes for this type of practice, both at the organisational level (for example Centres of Excellence[3] or What Works Centres[4]) and at the individual level.

One of the characteristics of these types of funding initiatives is the expectation of simultaneously promoting research excellence and engagement with non-academic audiences (although the perception of who constitutes the audience would vary across different councils). This fits in with the broader strategic role of the research councils; for example:

> Our strategic role as Research Councils is to enable research and develop research capability, whilst engaging with key stakeholders and addressing international challenges. (RCUK, 2016, p. 3)

The two organisations which are central to this thesis were established at different times in the evolution of this approach to engagement embodied in the move from "knowledge brokerage" to "partnerships". The ESRC Genomics Policy & Research Forum (The Genomics Forum) established in 2004, was positioned as a classic knowledge broker – charged with facilitating relationships between different actors and translating knowledge. On the other hand, Fuse – the Centre for Translational Research in Public Health, established five years later, had characteristics of a partnership organisation, in which different stakeholders were brought together and worked in a co-produced way.

1.4.2. The ESRC Genomics Policy & Research Forum

The Genomics Forum was an organisation active between 2004 and 2013, funded mainly from the ESRC. It was a part of the ESRC Genomics Network (EGN) – a major

[3] See for example: https://www.epsrc.ac.uk/research/centres/innovativemanufacturing/ or https://www.epsrc.ac.uk/research/centres/acecybersecurity/ [accessed: 28.08.2018]
[4] See: http://www.esrc.ac.uk/collaboration/collaboration-oportunities/what-works-centres/ [accessed: 28.08.2018]
[3]See for example: http://www.nerc.ac.uk/funding/available/schemes/placements/ [accessed: 28.08.2018]

ESRC initiative aimed at exploring social implications of the developments in genomic science - which consisted of three research centres: Cesagen at Cardiff University and Lancaster University, Egenis at the University of Exeter, and Innogen at the University of Edinburgh and the Open University. The Genomics Forum had the following objectives, as described in their final report (The Genomics Forum, 201, p. 5):

> 1. To exploit synergies across the three existing ESRC Genomics Centres and other relevant ESRC investments;
>
> 2. To encourage fruitful interaction with the range of genomic scientists, both nationally and globally;
>
> 3. To ensure the visibility and use of the ESRC Genomics Network and its output;
>
> 4. To assist with the engagement of policy-makers and publics;
>
> – to which the following objectives were added in Phase 2:
>
> 5. To encourage more attention on analysis of, and dissemination to, European, EU and other supra-national levels;
>
> 6. To establish a legacy for the EGN appropriate to the large scale of investment in and inherent significance of social scientific work on contemporary life science.

The Genomics Forum acted as an intermediary, connecting scientists, policymakers, business, media and civil society.[5] As such, it employed a multiplicity of strategies aimed at fulfilling its goals. Some of them were more administrative (for example supporting the functioning of the Genomics Network). Others – which are more central to this thesis – were aimed at facilitating collaboration between different stakeholders. The Genomics Forum described itself in its final report in the following terms:

> The Forum has acted as a catalyst and knowledge broker, developing and facilitating activities which have enabled the EGN to build research synergies across component Centres and to reach out to diverse groups of external stakeholders (The Genomics Forum, 2013, p. 11)

The Genomics Forum employed multiple strategies, ranging from the strictly research-related within a few work streams (although the Forum was not formally charged with conducting primary research) to different forms of research dissemination and public engagement. One such example was the Forum's organisation of Network-wide conferences. In addition, the organisation arranged 292 events for mixed science and

[5] Source: https://web.archive.org/web/20160527055445/http://www.genomicsnetwork.ac.uk/forum/ [accessed: 28.08.2018]

non-science audiences, including the Human Fertilisation and Embryology Authority (HFEA), the Human Genetics Commission (HGC), the Royal Commission on Environmental Pollution (RCEP), the Cabinet Office/BERR, the Department of Health and its Scottish equivalent, the Parliamentary Office of Science and Technology (POST), the Nuffield Council on Bioethics, the Wellcome Trust, the UK Patent Office, OECD, the pharmaceutical industry, and the national press (The Genomics Forum, 2013, p. 6). Additionally, the Forum managed and hosted Gengage, a public engagement network focused on genetics and healthcare, funded by the Scottish Government, who invested over £250,000 in this initiative (ESRC, 2015a).

Another approach to engaging with different audiences was through a programme called Bright Ideas Fellows in which the Genomics Forum hosted national and international visitors, including representatives of policy and practice and academia. In its lifetime, the Forum hosted 100 visiting fellows (The Genomics Forum, 2013). During their stays the visitors had a chance to engage with academics working in various disciplines, besides presenting their work to a wider audience (ESRC, 2015).

Finally, the Genomics Forum developed multiple forms of arts engagement, including events organised at the Edinburgh International Book Festival, Festival of Social Science and Creative Fellows/Artists in Residence (The Genomics Forum, 2013). Due to the focus of this thesis on policy and practice change, rather than on cultural engagement, these arguably innovative forms of engagement will be set aside. However, it should be noted that impacting on broader, societal debates can of course influence decision-making.

Through these methods, the Genomics Forum managed to achieve various impacts on policy and practice, both instrumental and conceptual (see: Nutley et al., 2007). It could be argued (as confirmed by the report and evaluation: The Genomics Forum, 2013, ESRC, 2015, and the interviewees' testimonies outlined in Chapter 6) that the Forum's most notable impacts fell into the category of conceptual, targeted at awareness and understanding, rather than concrete, instrumental changes. A key example of the conceptual impacts is cooperation with the OECD Working Party on Biotechnology which led to influencing framings of emerging genomic technologies and policy approaches to regulation. Nevertheless, the organisation managed to achieve a number of instrumental impacts, for example in terms of contributing to the

official UK documents on biofuels or influencing the Border Agency to stop the pilot programme of DNA testing of asylum seekers and later on not to evaluate it (ESRC, 2015).

1.4.3. Fuse – the Centre for Translational Research in Public Health

Fuse – the Centre for Translational Research in Public Health is one of five UK Public Health Research Centres of Excellence funded in 2008 and still running. It is a virtual centre that operates across five universities in the north east of England: Durham, Newcastle, Northumbria, Sunderland and Teesside. Fuse is funded by research councils and charities, including the British Heart Foundation, Cancer Research UK, the Economic & Social Research Council, the Medical Research Council and the National Institute for Health Research, under the aegis of the UK Clinical Research Collaboration (UKCRC)6. Fuse is one of the founding members of the NIHR School for Public Health Research (SPHR) – a partnership between eight academic institutions working in applied public health research in England7. Fuse's stated mission is[8] "to transform health and well-being and reduce health inequalities through the conduct of world-class public health research and its translation into value-for-money policy and practice". The organisation outlines its three aims as to[9]: "1.) Deliver world-class public health research; 2.) Build sustainable capacity; 3.) Build effective and lasting partnerships".

Fuse is implementing these goals through a variety of strategies. Arguably, its biggest innovation in research translation is AskFuse[10] – a responsive research and evaluation facility established in 2013. Thus far, AskFuse has worked on over 300 enquiries which resulted in 35 funded projects.[11] AskFuse is working with partners in Local Authorities, the NHS, general practice, and voluntary and community organisations across the North East and beyond. Another translational strategy is the researcher-in-residence model.

[6] Source: http://www.fuse.ac.uk/ [accessed: 27.08.2018]
[7] Source: http://sphr.nihr.ac.uk/about-sphr/ [accessed: 23.08.2018]
[8] Source: http://www.fuse.ac.uk/aboutus/ [accessed: 27.08.2018]
[9] Source: http://www.fuse.ac.uk/aboutus/ [accessed: 27.08.2018]
[10] See: http://www.fuse.ac.uk/askfuse/ [accessed: 27.08.2018]
[11] Source: http://www.fuse.ac.uk/aboutus/fuselegacy/ [accessed: 28.08.2018]

Fuse's work also includes broader engagement activities, such as events and seminars. Since 2008 Fuse has organised over 400 events[12]. One recurring event organised by the organisation was the Fuse Quarterly Research Meeting, organised each time along a different research theme within Fuse. The Quarterly Research Meetings are targeted towards mixed academic and policy and practice audiences. The organisation has also implemented various dissemination techniques, such as research briefs, animations, infographics and theatre, and a blog. Finally, Fuse has organised four international knowledge exchange conferences[13].

Through its various translational innovations – such as AskFuse and embedded researchers – Fuse managed to achieve various impacts, both instrumental and conceptual. By co-produced design of the rapid response facility (Rushmer & Shucksmith, 2016), the approach employed by AskFuse arguably increases the chances of evidence uptake, therefore, the organisation managed to achieve a variety of direct impacts, for example in school food policy, food labelling, NICE guidelines, WHO recommendations for sugar intake, the efficiency of the NHS services, etc. (Fuse, 2015). The most prominent example of a direct policy and practice change was a project aimed at supporting the cessation of smoking among pregnant women in the North-East of England[14]. The project started with a review of NICE guidelines on the roles of midwives and stop-smoking staff to identify best practices. This review has led to a redesign of the NHS referral pathways (in collaboration with the North East Tobacco Control Office (FRESH)) and an intervention delivered by midwives in eight NHS Trusts. The evaluation of the intervention, funded by the SPHR PHPES, showed that the number of smoking pregnant women in the NE had dropped by one third.

1.5. OVERVIEW OF THIS THESIS

This chapter has outlined the main puzzle and research question that the thesis aims to answer – that of the expectation placed on science to be useful in policymaking by being simultaneously engaged with the social and political context and autonomous from it. The next chapter, Chapter 2, presents the science policy background of this

[12] Source: http://www.fuse.ac.uk/aboutus/fuselegacy/ [accessed: 27.08.2018]
[13] Source: Source: http://www.fuse.ac.uk/aboutus/fuselegacy/ [accessed: 27.08.2018]
[14] See: http://www.fuse.ac.uk/nihrsphr/involvementengagement/workingtoreducethenumbersofpregnantwomenthatsmokeinthenortheast.html [accessed: 28.08.2018]

thesis – the research impact agenda. The goal of the second chapter is, on the one hand, to set the scene for empirical explorations and, on the other, to introduce the theoretical approach to the exploration of knowledge exchange and research impact – looking at them as institutionally driven phenomena. The chapter combines the analysis of literature on science policy paradigms with an analysis of science funding documents published from 1993 to 2016. In Chapter 2 I introduce the notion of institutional logics of academia and argue that the introduction of the research impact agenda has gone beyond an approach to assessing research to constitute a new institutional logic – a logic of impact.

Chapter 3 reviews the literature, exploring multi-disciplinary approaches to science, knowledge and policy. The chapter begins by exploring the issues relating to evidence and knowledge in policy and reviews two main ways through which evidence gains authority in policy: via technocratic assessments of reliability of knowledge in scientific terms (for example through formalised methods of evidence production, such as RCTs and systematic reviews), and via appropriateness to context and persuasiveness of evidence (Boaz & Ashby, 2003; Hawkins & Parkhurst, 2015). The chapter goes on to focus on experts and expertise, and in particular on expert impartiality and cognitive authority. The second half of the chapter summarises the literature exploring the various meanings of "use" of evidence, including classic debates on classifications of research use (e.g. Weiss, 1979), but also explores the literature on the politics of knowledge and political uses of research (including the classic work of Collingridge and Reeve (1986) and the debates it initiated). I also assess the literature on policy learning as a mechanism of knowledge usage. Lastly, this chapter covers the mechanisms of knowledge sharing, rather than production or use, and examines the literature on knowledge brokering. By analysing the literature, Chapter 3 outlines the current gaps in it and the contributions this thesis aims to achieve. These include: exploring knowledge exchange and creation of knowledge for policy purposes from the academics' perspective; exploring the mechanisms behind different types of knowledge use; and the legitimacy of knowledge exchange work.

Chapter 4 presents the methodology implemented in this study. It discusses the interpretivist and constructivist approaches to research, with a focus on the meaning that actors assign to social phenomena, besides considering practices as ways in which

these collective understandings are being operationalised. This chapter gives an overview of the approach to research design, including the case study approach, interviews and documents as data generation techniques, and grounded theory as an analytical approach. Furthermore, the chapter includes a methodological reflection, particularly in terms of the trust between researcher and research object, and the issue of consent in qualitative research. The chapter considers potential limitations of this approach, relating to interviewee recruitment, conceptual frameworks and generalisability.

Chapters 5-7 discuss the empirical findings. Chapter 5 begins with a discussion of the practices involved in knowledge exchange conducted by the university-based organisations and identifies three types of practices: conducting academic research, translating research, and conducting policy-relevant research, and discusses examples of these practices, their characteristics and the risks and benefits associated with them. Even though these practices are distinct in terms of their epistemology and the types of activities connected to them, in reality they co-exist and at times even blend. One of the reasons for this co-existence is the legitimacy of specific practices. In this chapter I give examples of changing mechanisms of validation of practices, for example the translation and production of policy research used to invalidate academic research. More recently, however, academic research has validated the translation and production of policy-relevant research. The chapter looks at strategies that academics employ to manage the hybridity of these three types of practices.

Chapter 6 discusses the various framings of knowledge exchange expressed by academics working in knowledge exchange organisations. This chapter begins with an analysis of the sense-making process regarding autonomy and impartiality – two qualities traditionally assigned to academic epistemic authority and the quality of produced knowledge (Guston, 2001), and perceived as being threatened by the research impact agenda and expectations of close collaboration between academics and non-academic audiences. The chapter goes on to discuss different framings of knowledge exchange – challenging, learning, providing actionable knowledge and advocating. These framings differ in the level of abstractedness of the policy change aimed at (ranging between knowledge and action) and the level of engagement with non-academic audiences (facilitation and representation). The analysis of multiple

framings of knowledge exchange offered an in-depth exploration of utilitarian and reflexive models of co-production found in the literature (and discussed by Lövbrand, 2011).

Chapter 7 explores boundaries and boundary work as a key factor shaping knowledge exchange. The data presented in this chapter point to the complexity of boundary work, as multiple boundaries overlap in this setting. In particular, this chapter looks into institutional and epistemic, inter and intra organisational boundaries. At the same time, it points out that the main boundary that knowledge exchange practices have aimed to mitigate was the one between science and policy/practice. The chapter discusses different strategies of boundary work, including boundary blurring, in which the strategy was aimed at developing hybrid practices combining aspects of both policy and science; and boundary setting, where the goal was to establish science as a legitimate area adjacent to policy.

Chapter 8 synthesises the empirical findings presented in the previous three chapters in order to introduce a holistic outlook on the separation and integration of science and policy. The chapter discusses the theoretical insights that can be asserted on the basis of empirical findings generated by this research. This chapter offers an in-depth discussion of the sources of legitimacy of knowledge exchange, presenting a four-streamed model of legitimacy including navigating excellent and policy-relevant research, as well independence and applicability of experts. These two insights provide a basis for a new, symbiotic model of the relationship between science and policy, one in which separation and integration co-occur in a scalar form. Chapter 8 goes on to discuss practical implications of this project.

In conclusion, Chapter 9 summarises the findings discussed in the thesis and proposes a programme of further research which could be developed on the basis of this work.

CHAPTER 2

INSTITUTIONALISATION OF RESEARCH RELEVANCE – BACKGROUND AND KEY CONCEPTS

2.1. INTRODUCTION

As outlined in the previous chapter, this thesis is addressing a particular conceptual and empirical puzzle: science is expected to closely engage with the social and political context while simultaneously stay autonomous from it. This problem – even though not entirely new within the inherently paradoxical setting of public funding of science (Jasanoff, 2011a) – has its antecedent in the recently emerging new paradigms of science-policy relationship. This chapter will continue this discussion by exploring in-depth the emergence of the focus on relevance of science – both as a theoretical concept and practical approach to science funding.

The goal of this chapter is to explore the science policy background in which Fuse and the Genomics Forum - the two knowledge exchange organisations at the centre of this thesis – operated. This goal will be achieved through two interlinked inquiries. First, I will summarise the debates on relevance of science in science policy literature by looking at three models of new types of science – Mode-2 (Gibbons et al., 1994; Nowotny et al., 2001), Post-Normal Science (Funtowicz & Ravetz, 1993) and Triple Helix (Etzkowitz & Leydesdorff, 2000). These three models, even though differing in terms of their approaches to change in academic institutions, share the basic assumption that the new societal challenges require reorganisation of the way knowledge is produced. Second, I will look into the ways in which these debates are translated into practice by presenting the context and modes of emergence of the research impact agenda in UK academia.

By combining these two inquiries, this chapter will not only set the scene for the discussion of empirical findings but also begin to address the main research problem by introducing some key explanatory concepts. In particular, by employing the concept of an institutional logic, this chapter will explore the changes in academic institutions

over the last two decades which lead to the emergence of knowledge exchange as increasingly incentivised academic practice.

2.2. RELEVANCE OF SCIENCE

The relevance of science to solving societal problems - or at least the promise of such broader applicability of scientific findings - is one of the main rationales behind public funding of science (Martin, 2011; Rip, 1997). At the same time, ever since the early public investments in science, it has become clear that merely providing science with resources does not necessarily produce results that will be directly applicable in society (Guston, 2000; Wilkie, 1991). This is where the main role of science policy lies – in finding ways to navigate the relationship between science and policy so as to ensure that science is both efficient and relevant (Guston, 2000). The ways in which science policy is to achieve this goal are not unambiguous, and in fact, recent decades have witnessed a paradigmatic change in this realm (Ruivo, 1994), moving from the social contract for science to new modes of knowledge production. This shift will be discussed in the remaining part of this section.

2.2.1. Social contract for science

One of the dominant ways of conceptualising the relationship between science and policy is by looking at it in terms of a contract – an unwritten agreement requesting one side (society) to provide science with funds and autonomy while, in return, the other side (science) promises to produce useful knowledge and innovation (Elzinga, 1997; Jasanoff, 2003c; Martin, 2003; Rip, 1997). Viewing the science-society relationship as a contract might provide a useful heuristic (Hessels et al., 2009) or "theoretical device" (Guston, 2000, p. 40) aimed at framing and capturing the social relationships between different groups. There are of course some limitations to this approach. For example, it might lead one to homogenise both sides and overlook the diversity of both science and policy. Furthermore, the contractual metaphor, like other economic metaphors (e.g. Knorr-Cetina, 1981), carries a risk of simplifying the complex reality which cannot be captured by a simple contractual exchange. Science is after all as much a cultural entity as a producer of useful knowledge. Nevertheless (and having these limitations in mind), science funding lends itself to such metaphors and many scholars have employed the idea of a "social contract" effectively to explain

the nuances of national science funding. For example, David H. Guston describes the social contract as follows:

> The political community agrees to provide resources to the scientific community and to allow the scientific community to retain its decision-making mechanisms and in return expects forthcoming but unspecified technological benefits. (Guston 2000, p. 62)

The basic assumption behind the social contract for science is that science's autonomy (or self-regulation) is linked with its productivity, understood in terms of providing society with useful knowledge. As argued by Guston (2000), this contract is not stable; rather it should be viewed as a dynamic mutual struggle to expand the contract according to each side's interests. The struggle is not completely transparent, because the terms of the contract are not themselves transparent (Guston, 2000). The emergence of the social contract for science is often linked in the literature with Vannevar Bush's document "Science. The endless frontier", published in 1945. But, as Guston (2000) argued, this does not necessarily mean that the social contract originated in this document; rather, this document is a rare form of codification of a largely implicit set of rules. The social contract for science assumes a "reciprocal boundary" (Guston, 2000, p. 58) between science and politics which should be protected to enable science to be both effective and produced with integrity. The importance of the boundary is particularly significant for the protection of basic research, as positioning science closer to industry with its pressure for immediate results would inevitably be detrimental to such research (Guston, 2000).

The social contract for science employed the assumptions of the linear model, according to which basic, curiosity driven research is necessary for further practical developments (Hessels et al., 2009). Therefore, the contract was based on the notion that good quality research (guarded by self-regulation and input of funds) would inevitably yield applicable knowledge. At the same time, the importance of the boundary has been challenged by claims that, in fact, the separation of science and politics does not guarantee either the productivity of science for the purposes of social benefit or the integrity of science. Guston (2000) has argued that, since the 1980s, the boundary between science and politics has become increasingly malleable due to the increasing importance of micro-economic relations, for example in the format of technology transfer policies.

Many scholars working in STS have challenged the notion that "basic" and "applied" are meaningful categories when applied to research. These researchers observed that this distinction is not entirely empirically adequate, as the two types of research are not actually separate but rather are subject to the illusion of separation, used politically by academics in their quest for funds and autonomy (Calvert, 2006; Clarke, 2010; Pielke, 2012). However, other scholars argued that the issue of basic and applied science is in fact deeply ingrained in the academic culture and is often used as a point of referral by scientists themselves (Boggio, Ballabeni, & Hemenway, 2016; Gulbrandsen & Kyvik, 2010; Roll-Hansen, 2017). For instance, Roll-Hansen (2017) suggested that the distinction between basic and applied research has been misunderstood by its critics, because each side of the distinction should be seen as an ideal type, rather than a close empirical representation of reality. He argued that these two types of research activity could, in fact, be conceptually distinguished, based on four dimensions (Roll-Hansen, 2017, p. 3):

a) Different kinds of knowledge – basic science aims to improve understanding; applied science is charged with instrumental problem-solving;
b) Different criteria of success – successful basic research "discovers new phenomena or ideas of general interest"; applied research is a "solution of concrete practical problems, depending on relevant and accurate knowledge";
c) Different social roles and effects – basic research is not accountable to concrete users, but merely to the "common societal interest and values" (hence needs independence and autonomy); applied research depends on and serves the funders, such as government, private firms, and partner organisations;
d) Institutional differences – basic research is produced autonomously from other institutions, whereas applied research is produced in response to the needs of other actors.

Roll-Hansen points out that, even though the two types of activity are conceptually different, they are not separate. The author sees the two as providing "mutual support" (and not as understood in the linear model in which one precedes another).

2.2.2. Integrating science and society

Despite the autonomy of science being one of the key values that academics hold on to, many scholars argue that, in fact, maintaining a separation between science and society may no longer be possible (or desirable) in the contemporary world. The 1990s and early 2000s witnessed a multiplicity of research studies (see also: Chapter 1 Section 1.1) exploring the relationship between science and society, and arguing that effective science-society relations require a close integration of the two, rather than scientific autonomy. There are multiple emerging models of this new science (for a review see: Hessels, van Lente, 2008) but here I will only summarise three key ones: Mode-2 science (Gibbons et al., 1994; Nowotny et al., 2001), Triple Helix (Etzkowitz & Leydesdorff, 2000) and Post-Normal Science (Funtowicz & Ravetz, 1993).

One of the most influential, yet, not uncriticised (Arnoldi, 2007; Etzkowitz & Leydesdorff, 2000; Fuller, 2005; Pestre, 2003; Tuunainen, 2002; Weingart, 1997), works representing this approach is *The New Production of Knowledge: The Dynamics of Science and Research in Contemporary Societies* published by Michael Gibbons and colleagues in 1994. In this book, the authors argued that a new model of knowledge production has emerged in modern societies (see a summary presented in Table 1). According to Gibbons et al. (1994), the increasing complexity of societal issues has posed a challenge to academic knowledge production, leading to the emergence of what they call Mode-2 science. In this new approach to science, knowledge production is deeply embedded in society (rather than limited to universities), and knowledge is being produced in the context of application. What the scholars call "contextualised science" assumes a deep embeddedness of science within society, whereby society in turn "speaks back" to science (Gibbons et al., 1994, p. 50). Gibbons et al. (1994) argue that Mode-2 science is a better fit for some disciplines than for others. Furthermore, Gibbons et al. (1994) and Nowotny et al. (2001) acknowledged that Mode-1 science did not replace Mode-2 entirely, and the implementation of Mode-1 varies across the disciplines.

Table 1. Attributes of Mode-1 and Mode-2 science.

MODE-1	MODE-2
University context	Context of application
Disciplinarity	Transdisciplinarity
Homogeneity	Heterogeneity
Autonomy (separation)	Social accountability (integration)
Peer-review quality control	Extended quality control

In a second book, *Re-thinking science* (Nowotny et al., 2001), the authors, perhaps in response to critics who argued that their work did not sufficiently engage with the existing literature, posited the emergence of Mode-2 within the literature on the knowledge society and the risk society. They argued that in contemporary society we are witnessing what they call a "de-differentiation" of institutions, with boundaries becoming increasingly blurred and categories overlapping.

Another framework similarly aiming to capture the science-society relationship through the institutional setting of science and society is that of the Triple Helix, introduced by Etzkowitz and Leydesdorff (2000). The authors argue that the three institutions of academia, of state and of industry, increasingly overlap, leading to the creation of a hybrid organisations across the different institutional orders. The Triple Helix is said to be dynamic and to remain in constant transition; but in addition, as indicated by the helix metaphor, the three institutional orders are at times close together and at other times become more separate. The co-evolution of different helices is cyclical and contains different sub-systems. However, the triple helix model assumes that the three elements of the system will retain their key responsibilities: knowledge production by the universities; commercialisation and economic development by industry; and regulation by the state.

Another important contribution aiming to explain the evolving science-society relationship is Funtowicz and Ravetz's "Post-Normal Science" (1993). The authors employ the Kuhnian notion of paradigms in science to highlight the development of a new format of science production – progressing from "normal" to "post-normal". Funtowicz and Ravetz (1993) argued that with the increasing complexity of policy challenges (for example that of environmental issues), the traditional "normal" models

of science are inadequate. One of the reasons for this inadequacy is the structure of the policy problems. In the normal model of science, problems can be divided into smaller components and solved without considering the broader paradigm underlying the issues. This is no longer the case with "post-normal" problems, which are characterised by uncertainty, plural values and diverse stakeholders (Funtowicz and Ravetz, 1993). Additionally, Funtowicz and Ravetz (1993) argue that this new model of science is cognisant of the urgency of policymaking, including the shorter timelines required by policymakers. Post-normal problems require public participation both in decision-making and in quality assessment of the results of scientific knowledge production, a process which the authors call "extended" peer-review (Funtowicz & Ravetz, 1993, p. 740).

One element that all these models of science-society interaction have in common is their focus on recent changes in the relationship between science and society, particularly in terms of a general move towards closer interaction of the two, blurring boundaries between production and use of research, and assessing research by criteria of relevance, rather than purely by its academic qualities. Some models (for example Mode-2 science) are more prescriptive than descriptive, making it difficult to ascertain how these models would be enacted in practice (Hessels et al., 2009). However, there are some common threads running across these different models, which suggests that, regardless of the precise terminology used (e.g. Mode-2 or post-normal science) or framing of the change (for example in terms of policy, of innovation or, more broadly, of all the different spheres), all these models link the relevance of science with its embeddedness in and implications for society as well as the interactions with non-scientific actors.

2.2.3. Autonomy of science

The previous sections have discussed two approaches to realising the relevance of science: through separation of science and society via the social contract, or integration of the two in new knowledge production. These two discussed models differ in one key area – their perception of science's autonomy. Despite the debatable empirical equivalency of the social contract/linear models (Edgerton, 2004), the notion of the separation of science and society and protection of basic research remains a strong

narrative both in funding policies and in debates among academics (for example in their response to the introduction of the so-called impact agenda – see Section 1 in Chapter 1). Many of these arguments assume that science's authority as well as the quality of research stem directly from autonomy, as that autonomy is the guarantor of knowledge being produced free from external influences and hence reflecting the truth about nature.

For example, Lacey (1999) argued that there are three elements of science's value-free structure: autonomy from social influence over the direction of research, neutrality of science's influence on values, and impartiality in assessing facts based solely on the cognitive assessment (without considering values). He prioritised impartiality and saw it as a basis of the other two elements. These assumptions were challenged by Heather E. Douglas (2009), who argued that in fact, even though science may not be impartial, it remains authoritative. Douglas maintains that the mere presence of values in the scientific process is not necessarily detrimental to science's authority. However, she further argues that such values should be made explicit, rather than hidden, if science is to lend authority to policy. A similar argument, although stemming from a different standpoint, was made by Betz (2013), who claimed that methodological transparency might provide an opportunity for asserting the impartiality of science.

Another scholar who has criticised the notion of the social contract and the value-free model of science embedded in the linear model is Roger Pielke Jr in his work on different models of engagement between scientists and policymakers. Pielke Jr (2007) outlined four such models: pure scientist, science arbiter, honest broker and issue advocate. These four models of science-policy engagement differ in terms of the willingness of different types of scientist/academic to engage with the politics of the policymaking process (therefore in their willingness to depart from the value-free ideal of science). In his categorisation, academics might take on different roles based on how political vs technical the issue is, along with the academics' individual preferences.

The pure scientist most closely reflects the ideal-type model of the social contract for science, in which science when left alone can produce knowledge that will be useful. From this perspective, pure scientists will be concerned with producing knowledge without consideration of its usefulness for policy, therefore staying away from social

and ethical values. The science arbiter, according to Pielke (2007), will engage with policy debates but purely on a technical basis, so a scientist within this model will only offer answers to factual questions. The honest broker, in Pielke's model, will engage with the policymaking process but only to the extent of presenting the available (and feasible) choices to policymakers. The honest broker does not shy away from engagement with values, but nor does this type of scientist limit the policy choices to his/her own preferences. Finally, the issue advocate does just that – advocates for a specific policy option. Pielke (2007) was especially wary of what he called "stealth advocacy" in which advocacy for specific options is disguised as pure scientists or science arbiter.

Pielke's (2007) framing captures a previously unoccupied space for combining values and scientific advice in a way that is neither completely value-free nor partisan. However, the underlying assumptions about the nature of the science-policy relationship of this model are questionable. Pielke's critics (e.g. Brown, 2008; Grundmann, 2017) pointed out that the assumption behind his model is still one of separation between science and society. By privileging the category of the honest broker, Pielke attempts to offer a model of engagement between science and policy which would allow the scientist to remain autonomous while simultaneously engaging with policymaking, which might not be possible in reality.

Pielke is not alone in his attachment to the impartiality of science (which will be discussed further in Section 3.3.3); this value is deeply ingrained not only in academic culture, but also in the broader society. "Disinterestedness" was listed by Robert Merton (1942) as one of the key norms of science. But the reality of knowledge production and sharing contradicts impartiality as a realistic norm (e.g. Grundmann & Stehr, 2012; Hoppe, 2005; Ingold & Gschwend, 2014; Nelkin, 1975), as highlighted by Jasanoff:

> Much of the authority of science in the twentieth century rests as well on its success in persuading decision-makers and the public that the Mertonian norms present an accurate picture of the way science "really works". (Jasanoff 1987: 196)

Jasanoff (1987) argued that science traditionally protected the authority gained from autonomy because the engagement with research users, for example in a policymaking

process, would risk exposure of situations where the science was not particularly aligned with the norms, such as disinterestedness or rules of ethical conduct.

2.3. INSTITUTIONALISING SOCIAL RELEVANCE OF SCIENCE WITHIN THE UK RESEARCH FUNDING SYSTEM

Against the backdrop of the conceptual debates over the relationship between science and policy, emerged a plethora of new research funding initiatives, aimed at increasing the engagement between academics and policymakers. The following sections (and arguably chapters) will illustrate the complex process of the roll-out of the research impact agenda and its transformation from a government strategic goal of increased relevance of the British Science in 1990s to almost all-encompassing framework if academic practices, structures and processes in the post-REF academe.

One of the common criticisms of the different models of new knowledge production presented in the preceding section is the insufficient consideration of how these broad macro-level changes in the relationship between science and society are being developed on institutional, organisational and individual levels (Benner & Sandstrom, 2000). Arguably a paradigmatic shift like that described by Gibbons et al. (1994), Funtowicz and Ravetz (1993), or Etzkowitz and Leydesdorff (2000) would require complex and multi-layered interaction between actors, norms and practices (Benner & Sandstrom, 2000).

A concept that could support understanding of the ways in which the notion of relevance is being implemented in academic institutions is one of "institutional logic" – sets of cultural and institutional paradigms driving practices and identities of actors within institutions (Thornton et al., 2012). The institutional logics framework is considered useful for analysing the way institutions change (Reay & Hinings, 2009; Swan et al., 2010; Thornton & Ocasio, 1999) and remain culturally and paradigmatically pluralistic (Greenwood et al., 2011; Weber et al., 2013). Hence, this framework is well-suited to studying change in academia, which is a complex and multi-paradigmatic field with multiple different guiding criteria, such as administration, teaching, entrepreneurship or research (Berman, 2012b; Lam, 2010;

Swan et al., 2010; Winter, 2009). The following sections will discuss the changes in the research funding system which have led to an emergence of a new logic – a "logic of impact", embodying the notions of applicability of research to solve societal problems.

2.3.1. Institutional logics

Institutional logic has been introduced as a meta-theory by Friedland and Alford (1991) and is linked to the turn towards neo-institutionalism in institutional theory (Powell & DiMaggio, 1991). It has since been further developed, with the most notable contribution coming from Thornton et al. (2012, 1999, 2008) who define institutional logics as:

> the socially constructed, historical patterns of cultural symbols and material practices including assumptions, values, and beliefs, by which individuals and organizations provide meaning to their daily activity, organize time and space, and reproduce their lives and experiences. (Thornton et al., 2012, p. 2)

Institutional logics are both material and symbolic – they combine formal and informal rules and guiding actors' behaviours and social interactions in institutions but also offer frames for interpretation and meaning (Thornton, Occasio, 1999, p. 804). Actors within organisations use these institutional logics as frames of reference which help to guide their behaviour, identities and even choice of vocabulary (Thornton et al., 2012). In that sense, institutional logics are inherently linked with and being enacted in (or "anchored by" – see: Swidler, 2001) practices. Institutional logics could at the same time enable and restrict actors' behaviour. On the one hand, institutional logics shape individuals' behaviour by providing them with opportunities both to exercise their agency and to champion organisational change by exploiting existing contradictions between the logics (Thornton et al., 2012; Friedland & Alford, 1991). On the other hand, institutional logics could constrain individual actions, as they are an organising force and filter for preferences, interests and repertoires of available and acceptable actions (Thornton et al., 2012; Friedland & Alford, 1991).

Therefore, institutional logics could be viewed as organisational paradigms (Kraatz & Block, 2008; Weber et al., 2013). Weber et al. (2013, p. 355) argued that institutional logics are forms of cultural repertoires and as such should be understood as relationships between basic cultural categories, such as identities, practices or values.

In the process of the emergence of a logic these categories are being aligned into increasingly coherent systems through the process of theorization and sensemaking (I will return to the idea of sense-making in Chapter 6). Society-level institutional logics often originate from different areas of social activity including market, corporate, bureaucracy, care, etc. (Lander, 2015). These society-level institutional logics are interpreted and adapted on a "local" level.

2.3.2. Research impact agenda as an institutional logic

Academia, as previously indicated, is a multi-paradigmatic setting where multiple logics co-exist. The two institutional logics, which arguably are key for understanding research impact agenda – are the traditional scientific logic of "excellence" and the newly emerged logic of "impact". These two logics are summarised in Table 2 and discussed in detail in the following sections. The table below is drawing on the analysis of documents (the process described in Chapter 4 Section 4.6) and grounded in the interviews with academics working in Fuse and the Genomics Forum (reflecting the iterative process of grounded theory discussed in Section 4.7). Table 2 illustrates the key dimensions of both logic, highlighting their various understandings of the objective and value of science as well as sources of legitimacy and linked practices.

Table 2. The overview of the logic of impact and the logic of excellence

	Logic of excellence	**Logic of impact**
Characteristics	Intellectually driven, motivated by academic freedom	Problem-driven or context-driven projects
Dominant objective	Quality of research	Applicability of research
Value of science	Realised through "speaking truth to power"	Realised through its applicability and engagement in the policy process
Legitimacy	Peers/experts	Research users
Practices	- Publishing in high impact journals - Objectivity - Mono-disciplinary research	- Advocacy, KE, policy advising - Collaborative and interdisciplinary research; Applied research, Practice-based research

The co-existence of these two logics is not unexpected as they embody historical tensions (and ones clearly indicated by the new knowledge production models discussed in section 2.2). For example, as argued by Vincent (2015) universities have been historically guided by four "senses" - religious, cultural, functional and authoritarian. Out of these four, two senses were traditionally in competition with each in the Western science: cultural and functional. Cultural sense, viewing science as a site of cultural production, originated in the Enlightenment ideas of universities as realms of "reason, science, civilisation and particularly high culture" (Vincent, 2015, p. 474). Functional sense of the university was linked to the nineteenth and twentieth century emergence of the nation state in which universities (especially newly funded civic universities) are seen as directly serving to the needs of the state and the market.

The logic of excellence embodies what Vincent (2015) described as cultural sense of science, drawing on the notions of culturally privileged position of science in society. This logic reflects the values historically associated with science, for example as expressed in Merton's (1942) system of norms in science – discussed in section 2.3.3 – such as communalism, universalism, disinterestedness and organised scepticism (Berman, 2012a; Lander, 2015). In the context of academic entrepreneurship in the US, Elizabeth Popp Berman (2012a, p. 9) described a cognate "logic of science" as one that "sees the search for truth as having intrinsic value. Science is fundamentally the pursuit of knowledge, in which practical results are an agreeable but secondary benefit".

The logic of excellence has a significant epistemic dimension. In line with these goals and values, science is seen as a quest to achieve universal, generalisable knowledge, assured by a process of peer-review. Since quality assessment and legitimacy are largely internal to science (for example through the peer-review process), the idea of good science entails independence from external influences (Guston, 2000). Therefore, the logic of excellence is inherently linked with the notion of academic autonomy (see: discussion in section 2.2.3). Historically, the international academic community privileged knowledge which is stripped from contextual information, is raised to the level of abstraction in order to be understandable and mobilised across different settings (Daston, 1995). Consequently, the norms regarding the quality of knowledge were shaped by this preference for de-contextualised knowledge, resulting

in, as highlighted by Lander (2015; see also: Calvert 2006), lower standing of applied research within this logic, as compared to basic research.

In this thesis I term this frame of reference a "logic of excellence" (rather than "logic of science" discussed for example by Lander (2015) and Berman (2012) in the context of entrepreneurship) for two key reasons. First, it is to indicate the locus of attention on the British institutions and discourses in which two identifiable components of knowledge production are impact and excellence (as exemplified by UKRI's slogan "Excellence with Impact"[15]). Second, using the term excellence (rather than science) is meant to highlight the fact that the notion of science devoid of any practical consideration is very rare when seen from the historical perspective (for example highlighted by the critiques of Mode-2 Science: Arnoldi, 2007; Etzkowitz & Leydesdorff, 2000; Fuller, 2005; Pestre, 2003; Weingart, 1997).

Therefore, applicability of research findings is not external to "science" but rather it is emblematic of the inherent duality between cultural and functional aspects' of academia driven by different forces and ideology, as compared to doing academic research. In that sense, the term "excellence" captures the core driving force of this logic which is research quality and adherence to academic standards of knowledge production. The existence of these two logics was strongly reflected in the interviewed academics' perceptions of the tensions they experienced within their work (the interplay between these two logics is key to Chapters 5 and 6). The logic of excellence was most clearly enacted in the interviewees' sense of priority of publishing in high-impact journals which was, in their perception, linked with research that is theoretically driven and carried out to the highest level of methodological standards. The logic of excellence was expressed in the perception held by some of the interviewees who posited the robustness of research as a key basis of achieving impact, for example:

> "If research is good it is going to have impact. […] Actually good, robust research can change policy because it's important." (Fuse 20)

By contrast, the logic of impact focuses on the applicability of science, hence it is predominantly problem-driven. This logic sees science as serving broader societal needs (cf. Nowotny et al., 2001). As such its core value is engagement with non-

[15] See: https://www.ukri.org/innovation/excellence-with-impact/ [accessed: 23.08.2018]

academic actors, rather than autonomy. The interviewees' accounts of this logic were closely linked with addressing policy and practice challenges by working directly with policymakers and practitioners. Here, the priority was not a theoretical value of research or even its methodological purity but rather its capacity to motivate action, for example:

> [We are not] scooping up the data and disappearing off to [publish] findings in three years time, we are working more interactively, more collaboratively with them so that we're feeding back results, they may not be finished or final results but they provide timely information to these projects and to these people to help inform practice and policy. (Fuse 9)

Before expanding on this discussion on the meaning of science embedded in different logics in Section 2.5 (and the following chapters), the next section will discuss the emergence of the logic of impact, as it helps to explain this specific focus on engagement and collaboration with non-academic actors.

The development of this logic is predominantly linked with the changes in research funding and incentive system; however, focusing solely on the resource environment would be redundant in explaining the scope of the changes resulting in the emergence in the logic of impact (cf. Binder, 2007). As pointed out by Weber et al (2013, p. 355) not all logics are equal and in fact "as cultural systems, they vary in coherence, complexity, scope, and other dimensions". Therefore, studying the emergence of the logic is essential in capturing not only the basic principles inherent to the logic but also its dynamic quality and socially constructed nature (Weber et al. 2013, Swidler 2001). As such the emergence of the logic should be explored in terms of the gradual systematizing and ordering of previously looser cultural norms (Swidler, 1986; Weber et al., 2013).

A key consideration here is whether the impact agenda has truly resulted in an institutional logic, as opposed to a less encapsulating cultural register. Here, Thornton et al. (2012) argue that new ideas, theories, framings, or policy interventions do not necessarily lead to the development of a new institutional logic, as they do not all generate changes in practices and understandings. According to Thornton et al. (2012), the following elements support the emergence of a new institutional logic: 1.) the influence of societal and external logics; 2.) changes in resource environments; 3.)

emerging theories, frames and narratives; 4.) changes in practice; 5.) changes in vocabularies of practices; and 6.) field-level institutional logics. The following sections will show that, in fact, all of these changes have occurred in the UK academia in recent decades, confirming the assertion that the logic of impact did indeed emerge as an institutional logic.

2.4. THE GRADUAL EMERGENCE OF THE LOGIC OF IMPACT

The central debate in terms of the development and spread of new institutional logics (but also more broadly, institutional change – see: Thornton et al., 2012, Berman 2012b) is the tension between top-down and bottom-up change, for example in terms of structural changes versus institutional entrepreneurs. The main transformations that I discuss in depth transpired in terms of: changes in the research funding (resource) environment shaped by the introduction of the market logic and New Public Management in academia. However, even though the influences of the market logic were critical to the emergence of the logic of impact as a coherent and expansive logic, it is not the only factor supporting the emergence of this logic. As pointed out by Vincent (2015) the research impact agenda is ideologically hybrid as it is embedded in hyper-functionalist vision of the university (one in which its dominant role is to serve a function to its environment) and neoliberal ideology with marketised approach to science and managerialistic mode of managing knowledge production.

This ideological hybridity (discussed in the following sections) is stemming from the process of simultaneous top-down and bottom-up development in which the institutional changes were initiated at the macro-levels of decision-making (e.g. by the government or research councils) but the logic was shaped by the actors implementing it in practice, their motivations and value systems (cf. Binder, 2007; Martin et al., 2017; Smets et al., 2015).

2.4.1. Top-down changes in the research funding environment – historical overview

One of the key drivers of the impact agenda and subsequent development of the institutional logic of impact was the change in the research funding and assessment of

publicly funded science in the UK. These changes embody two of the conditions supporting the development of a new institutional logic, as discussed by Thornton et al. (2012) – changes in the resource environment, and the influence of societal and external institutional logics. The logic of impact has emerged as a result of introducing the logic of the market into academic life, along with a new way of approaching the public value of science, that is, from a managerialistic perspective in terms of accountability for public spending, pursued by measuring and reporting the value of investment for the taxpayer. It has been further strengthened by the modernisation of governing paradigms under the Labour government in the late 1990s, with the emerging focus on evidence-based policymaking as one of its tenets (Cabinet Office, 1999, 2000). These changes in management of public funds have led to changes in the funding schemes (for example through introducing the "Pathways to Impact" and REF impact case studies discussed below) which prompted multi-level institutional changes within higher education institutions. This section will explore these changes by tracing the impact rhetoric across research funding documents published over the last thirty years. The documents are discussed in detail in the following sections and summarised in Table 3.

Realising Our Potential

The research impact agenda in its current form can be traced to documents as early as the 1993 White Paper *Realising Our Potential*. The foundation of this document was the proposition that British science exceled at producing high quality research but struggled with the applicability of its findings (Cabinet Office, 1993). The White Paper introduced a set of policy ideas to ameliorate this obvious discrepancy between the value assigned to science and the levels of its applicability. This document constituted a clear indication of a market logic employed to the issue of applicability of science, as the aims of the policies are not framed purely in terms of public good but also in economic terms of maximising "value for money" through the government's investment in science and technology (Cabinet Office, 1993, p. 5).

Table 3. A summary of documents establishing the impact agenda

Name of the document	Year	Document's summary
Realising Our Potential	1993	• The economic value of science and technology to be made explicit • Development of the organisational structures that would make realisation of the applicability of science "more clearly and openly set and pursued" (Cabinet Office, 1993, p. 7) • Cultural change in academia through encouragement of cooperation and communication between academics and external audiences
Lambert Review of Business-University Collaboration	2003	• Review of the state of the knowledge transfer initiatives in the UK • Recommendation as to how to improve collaboration with the industry
2004-2014 Science and Innovation Investment Framework	2004	• Introducing measurement and planning of impact activities, for example increasing the levels of knowledge transfer as a target for the Treasury • Research councils charged with "greater responsiveness" of research • Research councils required to introduce a more systematic approach to KT
Warry Report Increasing the economic impact of Research Councils.	2006	• A strategy to increase the economic impacts of research • Chief Executives assigned a responsibility for "the economic relevance of their programmes and for the impact of their spending, through objective delivery process" (Warry, 2006, p. 3). • Impact to be incorporated "in the terms under which funding is awarded" (Warry, 2006, p. 8).
RCUK Increasing the Economic Impact of the Research Councils	2007	• Research Councils to implement incentives to encourage academics to do KT and impact activities • Research councils to "harmonise and simplify" funding schemes aimed at research impact – basis of Pathways to Impact (to be introduced in 2009)
REF Guidelines on submission and assessment	2011	• Guidelines for submission of the impact case studies, including a definition and assessment criteria
Lord Stern, Building on Success and Learning from Experience. An Independent Review of the Research Excellence Framework	2016	• Recommendation to loosen the link between research and achieved impact. • Recommendation to employ a broad definition of impact (including some impacts on academic audience)
HEFCE Initial decisions on REF 2021	2017	• Research councils and Funding councils will work on unitary definition of impact. • Impact continues to be linked with excellent (2* research)

The aims of the overall strategies presented in the White Paper were twofold. Firstly, it declared a dedication to making the value of science and technology in the UK more explicit. Secondly, it signalled development of the organisational structures that would make realisation of the applicability of science pursued on a larger scale. The document (Cabinet Office, 1993, p. 2) acknowledged the challenge with incentivising relevance of science as it requires a balance "between the freedom for researchers to follow their own instincts and curiosity, and the guidance of large sums of public money towards achieving wider benefits". Consequently, the document indicated that what is required is "a key cultural change: better communication, interaction and mutual understanding between the scientific community, industry and Government Departments" (Cabinet Office, 1993, p.5). Looking at the *Realising Our Potential* in terms of prospective cultural change explains the long-term approach outlined in the document and the scale of changes it initiated, encompassing all important parts of public funding of research in the UK.

Research impact within the Research Councils

Early 2000s brought in the new strategy for realising the social and economic benefits of science, based on setting up targets and examining performance indicators (another clear link to market logic). This approach was initiated by the *Lambert Review of Business-University Collaboration,* released in December 2003. HM Treasury responded to the review in its *2004-2014 Science and Innovation Investment Framework,* published in July 2004. The framework introduced a range of economic targets that the government aimed to achieve and to report on annually in stocktaking exercises measuring performance against the indicators (HM Treasury, 2004). Increases in knowledge transfer constituted one of the targets set out by the Treasury:

> Greater responsiveness of the publicly-funded research base to the needs of the economy and public services:
>
> - Research Councils' programmes to be more strongly influenced by and delivered in partnership with end users of research;
> - Continue to improve UK performance in knowledge transfer and commercialisation from universities and public labs towards world leading benchmarks. (HM Treasury, 2004, p. 6)

Responsibility for the "greater responsiveness" of research financed by public funds was placed on the research councils, which were required to set targets for increased

levels of knowledge transfer and collaborative research (HM Treasury, 2004). This strategy was in line with the overall direction set up in *Realising Our Potential*: the levels of knowledge transfer (see: the discussion on evolving policy terms in Section 2.6) were to be increased, particularly through greater interaction of research with non-academic audiences. The framework, however, added an element of measurement and planning of the levels of knowledge transfer (hence approaching it from a managerialistic perspective). This recommendation prompted the councils to publish Delivery Plans, in which they set out targets and strategies aimed at accomplishing them (e.g. ESRC, 2005, 2006, 2007, 2008, 2011, 2016)

The 2004-2014 Investment Framework prompted the research councils to introduce a more systematic approach to knowledge transfer. One such initiative was an expert group led by Peter Warry, the Chair of the Particle Physics and Astronomy Research Council, which worked to establish a strategy for increasing the economic impact of the research councils' investments (RCUK, 2007). The result of the group's work was *Increasing the economic impact of Research Councils*, also called the Warry Report, published in August 2006. Similarly, to the recommendations in *Realising Our Potential*, those of the Warry Report were described as stemming from the gap between excellent science and poor implementation. However, the Warry Report was more precise than the 1993 White Paper, assigning the reasons for the gap to lack of funding for the middle of the process of research exploitation, between the initial funding of research from public funds and the funding of exploitation activities by the private sector (Warry, 2006, p. 7). Therefore, the overall strategy presented in the document was to intensify the research councils' activities in the post-research stages.

The Warry Report recommended that the Chief Executives of each of the research councils be assigned responsibility for "the economic relevance of their programmes and for the impact of their spending, through objective delivery process" (Warry, 2006, p. 3). Arguably, the recommendation with the most far-fetching consequences was one requiring impact to be incorporated "in the terms under which funding is awarded" (Warry, 2006, p. 3). Impact was not only to be maximised in relation to past projects, for example in the form of "follow-on" funding, but also to become one of the selection criteria in the grant-awarding process. One of the ways of ensuring this was to make changes to the peer review process. The recommendations ranged from the selection

criteria for panel members to capacity building through training and guidelines on assessing the potential for impact (Warry, 2006). Additionally, it was recommended that applications for responsive mode funding should include the prospective beneficiaries of the project (Warry, 2006, p. 5). Overall, research councils were required to be more diligent in their approach to measuring and communicating their impacts:

> Research Councils should make strenuous efforts to demonstrate more clearly the impact they already achieve from their investments […] It is important to measure outcomes, however difficult, rather than outputs. (Warry, 2006, p.5)

In 2007, the RCUK published its response to the Warry Report and in 2008 a report "Excellence with impact. Progress in implementing the recommendations of the Warry Report on the economic impact of the Research Councils". In order to implement the recommendations outlined in the Warry Report, the RCUK has declared its intention to:

> Provide incentives to encourage researchers to participate in knowledge transfer and promote the economic impact of Councils' investments […]. (RCUK, 2007, unpaginated)

At the time the Warry Report was published, the research councils offered diverse funding schemes aimed at increasing impact; for example, BBSRC, EPSRC, MRC, NERC and PPARC had follow-on funding and the ESRC had impact grant schemes (RCUK, 2007). In response to the Warry Report, the RCUK has undertaken to unify the strategies for impact across the different research councils; to:

> Harmonise and simplify the range of knowledge transfer funding schemes available and introduce common terminology and branding where appropriate. (RCUK, 2007, unpaginated)

These changes have resulted in the cross-council approach to impact with its key new development – the so-called Pathways to Impact, introduced as a standard element of grant applications.

Pathways to impact and REF

As a result of these changes, the research councils announced that they would make changes to the assessment criteria to include the economic impact of the projects as a criterion of funding. This new, integrated approach to the assessment of funding was realised in 2009 by the introduction of an "impact plan", soon to be replaced by the

Pathways to Impact (Payne-Gifford, 2014). The Pathways to Impact is a document setting out steps to be taken to benefit the stakeholders of the research; it is a prerequisite of funding through research councils:

> A clearly thought through and acceptable Pathways to Impact is an essential component of a research proposal and a condition of funding. Grants will not be allowed to start until a clearly thought through and acceptable Pathways to Impact statement is received.(UKRI, 2018)

Even though the initial focus in the formulation of the impact agenda lay heavily on the research councils, the moves towards measuring and reporting impact were soon followed up by the second leg of the UK's dual funding system – the funding councils and, in 2014, their Research Excellence Framework (REF), the first research assessment exercise to include an explicit impact element. In designing the impact element of the REF, the HEFCE consulted the RCUK (REF, 2010). The two sides of the dual funding system divide the scope of the assessed impact: the REF assesses only past impacts, whereas the RCUK's[16] Pathways to Impact are designed to assess the potential for future impact.

The impact element in the Research Excellence Framework was foreshadowed in different documents, dating back to the decade prior to the exercise conducted in 2014. The 2004-2014 Science and Innovation Investment Framework proposed developing a new approach to evaluation within the Research Assessment Exercise[17]:

> The new approach to assessing research, through reforms to the Research Assessment Exercise, which will form the basis of the HE funding bodies' allocation of research funding from 2008, will provide greater reward, and thus stronger incentives, for academics to work on both research relevant to users and work which crosses disciplinary boundaries. (HM Treasury, 2004, p.11)

In "Increasing the Economic Impact of the Research Councils" the RCUK pledges to work with the UK Funding Councils:

> as they develop a successor to the Research Assessment Exercise, emphasising the importance of giving due recognition to collaborative research, knowledge transfer and other activities that contribute to economic impact (RCUK, 2007, unpaginated).

[16] In April 2018, RCUK was transitioned into United Kingdom Research and Innovation (UKRI) bringing together the seven Research Councils, Innovate UK and the research funding from Higher Education Funding Council for England (HEFCE), see: https://www.gov.uk/government/publications/higher-education-success-as-a-knowledge-economy-white-paper [accessed: 28.08.2018]

[17] Research Assessment Exercise was replaced by Research Excellence Framework in 2014.

In January 2009, John Denham, the Secretary of State for Innovation, Universities and Skills, wrote a letter to the HEFCE in which he outlined his expectations of the new assessment exercise:

> The REF should continue to incentivise research excellence, but also reflect the quality of researchers' contribution to public policy making and to public engagement, and not create disincentives to researchers moving between academia and the private sector.(cited in REF, 2009, p. 4)

REF documentation fit into the continuous narrative of the need to make the benefits of British science more explicit and better communicated not only to the wider society but also to the government (REF, 2010, p. 11). Thus, according to the HEFCE, adding the impact element to the research excellence assessment exercise could be beneficial to the higher education sector by making the role of research in society more visible (REF, 2011a).

The 2014 REF was preceded by a lengthy process of preparation, including two consultations in 2007 and 2009 and an impact pilot exercise in 2010. As the impact element is new to research exercises, it was deemed "developmental" by the HEFCE (REF, 2011a, p. 5), suggesting that the criteria of assessment could be changed in the future. Impact in the REF is defined as:

> All kinds of social, economic and cultural benefits and impacts beyond academia, arising from excellent research, that have occurred during the period. (REF, 2011a, p. 4)

These benefits are assessed according to two broad criteria of reach and significance (REF, 2011a, 2011b). The research impact within this scheme was captured in impact case studies, outlying the research basis for impact followed by a description of impact and supporting material.

2.4.2. Bottom-up movements and legitimising practices on the periphery

Even though the research impact agenda in the UK is arguably driven to a large degree by top-down changes in the research funding and incentives systems, its reception and format have been to a degree shaped by the ways it has been received and institutionalised at the individual level. One key observation here is that the emergence of the research impact agenda is not the same as the emergence of "impactful" practices, such as public engagement and participation, advising or co-production. In

fact, Heather Douglas (2009) has argued that the era of post-war basic science (see: the discussion on the social contract for science in 2.2.1 above) should be viewed as an anomaly, rather than a norm, when looked at from a historical perspective as public funding of science has been inherently linked with at least some degree of expectation of applicability of knowledge (Clarke, 2010; Wilkie, 1991).

The introduction of the research impact agenda has resulted in changes in these areas where collaboration between science and policy was developing organically. As shown by Smith and Stewart (2017a), academics working in social policy observed that recent moves towards impact have resulted in institutional support and access to resources when conducting policy-relevant work. Therefore, the activities that academics in this setting used to do on the basis of their internal motivation were now legitimised and resourced by their institutions (Eynon, 2012; Watermeyer, 2014).

Consequently, the research impact agenda did not emerge in a vacuum, but rather had a strong basis in practices which were already aligned with some (but not all) of its ideological tenets, such as working with different audiences and supporting the participation of different stakeholders in knowledge production and sharing (Matthews et al., 2017; Pain, Kesby, & Askins, 2011; Watermeyer, 2014). The ways in which academics' and funders' views differed were less often centred on whether impact should be an academic ideal at all, but instead on how to measure, document and incentivise impacts. As argued by Eynon (2012, p. 1): "It is perhaps the matching of our 'everyday' impacts with the 'required' impacts where the heart of the challenge lies". This perception of the difference between existing engagement practices and REF's prescriptions for impact were not only common (Watermeyer, 2014) but also point to the ideological hybridity of the logic of impact in which one type of practice could be justified by drawing on multiple ideological standpoints (for example neoliberalism and social movements – see: Eynon, 2012, Pain et al., 2011, Slater 2012).

The discussion on the changes in the funding environment of the UK research, as well as its bottom-up implementation, point to a number of key insights into the emergence of the logic of impact as a guiding force of academic practices. The most evident one being a close rhetorical link to the market logic with references to efficiency, value for money and measurement and evaluation of results. Furthermore, this discussion

outlines the process of both narrowing down the concept of impact while simultaneously expanding the reach of the logic from government strategic priority, through research councils' target, to an expectation placed on individual researchers in Pathways to Impact and REF.

This points to the emergence of the new logic of impact as a gradual systematising of existing cultural practices. As described by Weber et al.:

> A loose toolkit of meanings and practices becomes increasingly ordered, aligned, expansive, and cohesive, in the understanding of participants. (Weber et al., 2013, p. 356)

Since the 1990s, the seemingly disorganised sets of practices and research priorities have become cohesive. From a wide variety of possible forms of social and economic benefits of science emerged a more narrow (and measureable) concept of research impact. The way in which different practices aligned with the logic of impact reflect what Berman (2012b) calls a "practice selection" model of institutional change. Berman (2012b) argued that institutions change when actors within them experiment with practices based on non-dominant logics which at times, during the shifts in the external environment, gain enough support and access to necessary resources for a new logic to emerge. For example, as argued by Berman (2012), in American science, actors experimented with notions of entrepreneurship which led to an emergence of "ecology of practices" (Berman, 2012b, p. 290), and in the 1970s changes in policy priorities led to support for these previously non-dominant types of practices. Arguably, a similar process occurred in UK academia, where, following the introduction of REF impact case studies, previously peripheral practices have become increasingly central (which will be central to discussion in Chapter 5). These bottom-up movements and experimentation with knowledge exchange practices were supported by new sources of available funding (RAND, 2014; Smith & Stewart, 2017a) as well as institutional support at the university level, such as structures, roles and processes for managing REF, knowledge exchange offices, etc.

2.5. THE MEANING OF RELEVANCE

The preceding sections explored the way in which the logic of impact has emerged as a result of both a top-down and a bottom-up process. Thus far I argued that the dominant drivers of the research impact agenda were government-initiated changes in

the funding of science, progressively moving towards a concrete and measureable conceptualisation of impact and its implementation on both sides of the dual-funding system in the UK. This section will expand the discussion of the research impact agenda by looking in depth at its symbolic structure. In particular, this section will focus on two issues: 1.) regarding the understanding of "science" embedded in both of the logics and 2.) regarding factors framing of "impact".

2.5.1. The models of science in the logic of impact and the logic of excellence

The central difference between the logic of impact and the logic of excellence is the way they conceptualise the role of science in society (as illustrated in Table 2). The new logic of impact – as highlighted in the preceding sections – sees engaging with non-academic audiences to stimulate research-informed changes as one of the central tenets of relevance. This does not mean that the traditional version of science embodied in the logic of excellence completely rejected the idea of research as useful to external audiences. Rather, the difference between the logic of impact and the logic of excellence lies in the inherent meaning of relevance embedded in these two logics.

The logic of excellence does not entail a lack of usefulness of science, but instead assumes that the value of science is realised through providing decision-makers with a background of knowledge on which they can draw (Berman, 2012; Weiss, 1979). For example, in Vannevar Bush's 1945 strategic document discussed in Section 2.2.1, science is often described as a "reservoir model". One important distinction, explored in detail throughout this thesis, is between the reservoir model of science and a view of science as "ivory tower" of complete academic freedom and autonomy (Lam, 2010). The framing of usefulness of science implicit in the logic of excellence, even though drawing directly on the value of separation of science and society as the key identifier of their relationship (see: Chapter 1 Section 1.1), is not the same as seeing science completely devoid of any practical value (Berman, 2012a). Rather it assumes that 1.) the responsibility for the use of science lies with the research users and science's role is to make the knowledge available and ensure that it is of the best possible quality (in academic terms); and 2.) the role of science is scientific description rather than normative consideration of wanted (or unwanted) outcomes. So, similarly to Pielke's (2007) "pure scientist" discussed in Section 2.2.3, this model of science would assume

that science's role is to provide unfiltered information to policymakers (Martin, 2003; Martin, 2011).

The logic of impact assumes a different understanding of what makes knowledge useful to policy and practice. This logic is based on a framing that highlights a need to engage with research users in order to identify problems, potential solutions and expected or desired results (as evident in the REF's focus on measureable outcomes, see Section 4.1.3). In that sense, the logic of impact goes beyond scientific description to provide the normative construction of the desired reality, akin to the epistemological characteristics of applied research (Roll-Hansen, 2017; Schauz, 2014; see also Section 2.2.3). According to theories and framings of the impact logic, science is useful to policymakers if it responds to their needs (hence the calls for increased engagement). Additionally, because academics must show evidence of impact to prove that they have achieved it, the process of self-regulation has been augmented by the element of non-academic assessment (REF, 2011b; Watermeyer & Chubb, 2018): it is up to the policymakers and practitioners to confirm that the research has actually achieved the reported impact (as the scale and significance of the impact are assessed by mixed academic and non-academic panels). Accordingly, the logic of impact is based on the following understandings of science's relevance: 1.) the responsibility for the use of science is placed on academics and policymakers alike; 2.) in order to be useful science has to go beyond description and offer specific implications for practice (akin to literature on knowledge exchange: Mitton et al., 2007)

2.5.2. What makes "impact" such a powerful concept?

The previous section explored different framings of science inherent in the two logics: the logic of impact and the logic of excellence. At the same time, the institutional and organisational perspective on the relevance of research points to the fact that there are multiple reasons why the research impact agenda in the UK was so widely adopted and has led to institutional and cultural changes in academia. Therefore, the way 'impact' itself was framed affected the applicability of this concept in different settings. Two of the framings were particularly important in supporting the wide dissemination of the logic of impact: 1.) impact has been constructed in a way that can

be universally applied to all areas of science; and 2.) the process of achieving impact has been simplified to increase engagement with stakeholders.

The first signifier of the impact agenda is its construction of "impact" as a policy term that can be applied to all types of research, for example without consideration of the "basic" or "applied" nature of research and without differentiating across disciplines (see Section 2.2.3). This does not mean that this distinction has completely disappeared, as it is still used in many research funding areas (e.g. MRC, 2013). However, there is a subtle but important move in the way the government and funding bodies have conceptualised the issue of exploitability of scientific research in policy, the economy and society. In the early documents, this debate was largely concerned with funding a sufficiently diverse portfolio of basic and applied projects (Cabinet Office, 1993). The later documents, while discussing impact, were focused on highlighting its applicability to different areas of academic inquiry; even more directly, they highlighted a need to introduce ways of cutting across the basic–applied division. A clear example of this move might be found in another important impact agenda document, *Science and innovation investment framework 2004-2014*:

> The UK research funding system will continue to allow space for fundamental basic research, complemented by strategic priority programmes and incentives for researchers to work on projects focused on application. It will also need to find ways of combining these two approaches, to bring together public and private funding and research talent to work on major research challenges with major societal impact. (HM Treasury, Department for Trade and Industry, & Department for Education and Skills, 2004, p. 23)

This aspiration to combine different types of research in the effort to produce social and economic benefits was clear in the progressively unified funding and assessment criteria of impact. RCUK (2008, p. 12) stated clearly: "High quality research, whether basic or applied, has major impacts beyond creating new knowledge". This rhetoric had a clear material implication – Pathways to Impact cut across all the funding councils and introduced a single definition of impact (see: Section 4.1.3) that was to be applied to all disciplines. Similarly, the REF was designed as "a single framework for assessment across all disciplines" (REF, 2011b, p. 4). As such, REF2014 guidance aspired to provide a system of universal measurements that would then be applied to all disciplines:

> Panels have been instructed to define criteria and adopt assessment processes that enable them to recognise and treat on an equal footing excellence in research across the spectrum of applied, practice-based, basic and strategic research, wherever that research is conducted; and for identifying excellence in different forms of research endeavour including interdisciplinary and collaborative research, while attaching no greater weight to one form over another. (REF, 2011b, p. 4)

As argued previously in this chapter, the division between basic and applied research, even if it does not necessarily reflect academic practices empirically (Calvert, 2006; Pielke, 2012; Roll-Hansen, 2017), is deeply internalised by many academics (Roll-Hansen, 2017). Framing of impact as something that cuts across disciplinary boundaries, as well as boundaries between basic and applied research, does not necessarily mean that these categorisations are no longer relevant. However, it offers a framing of "research impact" as a concept that could be universally applied to different disciplines and a goal that all academics, regardless of their disciplines, could be pursuing. In that sense it discards the division of labour between different areas of scholarship, and even disciplines, that placed the responsibility for producing directly useful science onto disciplines with more applied angles.

The second rhetoric of the impact agenda assumes engagement with non-academic audiences as a key mechanism through which impact is delivered. The science policy documents summarised in Table 3 were concerned not necessarily with the type of research that ought to be produced, but rather with the proximity of the academic to the potential research user. For example, the Lambert Review stated:

> The best forms of knowledge transfer involve human interaction, and the Review makes several recommendations designed to encourage more frequent and easy communications between business people and academics. It suggests that research collaborations might be made easier to agree if model contracts could be developed on a voluntary basis to cover the ownership and exploitation of intellectual property (IP). (Lambert, 2003, p. 31)

Similarly, RCUK's *Progress in implementing the recommendation of the Warry Report on the economic impact of the Research Councils* (2008, p. 6) stated: "An effective interface between the research and user base is a prerequisite for high economic impact". By promoting specific behaviours, rather than steering research priorities, the framing of impact presented in the science policy documents also made impact at least potentially applicable to all projects.

The examination of the symbolic construction of the impact agenda unveils an additional feature of theories and narratives as constitutive elements of institutional logics. As highlighted in this section, the symbolic framings not only signal the emergence of a new logic, but also might influence, through their structure, the new logic's potential for gaining prominence. For example, constructing impact as universally applicable to all kinds of research has made it possible to introduce it as a general funding and evaluation criterion, which in turn has supported the spread of the logic across different settings.

2.6. DOING IMPACT? INSTITUTIONALISING PRACTICES OF ENGAGEMENT

One of the key characteristics of an institutional logic is that it leads to changes in practice (Thornton et al., 2012). And in fact, there is a strong indication that the impact agenda has led to changing practices in UK academia. In Section 4.2 I discussed how the bottom-up practices have been increasingly legitimised and supported by resources, aiding the top-down emergence of impact as an institutional logic within academia. In this section I will discuss the ways in which the research impact agenda emerged as an institutional practice at the meso-level - within universities and research councils, hence mediating top-down and bottom-up processes.

The research impact agenda – and the REF in particular – has contributed to an important shift in the institutional practices of UK academia. The funding changes introduced prior to the REF (Lambert, 2003; RCUK, 2007), which aimed at an increase in the social and economic benefits of science, made a significant difference at the top level, in the way research councils are held accountable to the government (RCUK, 2007; Warry, 2006); but also at the individual level of research funding, where academics had to strategise and plan their impact activities. However, the introduction of REF impact case studies has influenced the way universities manage their staff, their strategic priorities and their organisation. As shown in the RAND (2015) evaluation of impact, the process of preparing the impact case studies for REF2014 on the university level went beyond reporting the social benefits of research conducted within the units of assessment, and led to a number of new institutional and organisational practices. UK universities invested resources in impact capabilities, for

example in staff training (RAND, 2015). Furthermore, preparations for the exercise led to the establishment of impact-related positions and structures (e.g. KE and impact offices) within universities (RAND, 2015). The changes initiated by the REF have impacted on staff recruitment and promotion criteria, as knowledge exchange is increasingly named in promotion criteria[18]. Furthermore, research impact and knowledge exchange have been added to universities' missions and strategies[19].

Undoubtedly, the research impact agenda has influenced the way higher education institutions operate. At the same time, these changes in university institutional practices illustrate how the hybridity of the two institutional logics are developing in ways that highlight their contradictory nature. The REF clearly differentiates between "impact case studies" and "outputs" elements (in the form of academic publications). And universities seem to be following this distinction, by separating (at least to a degree) training and support for conducting impact from other more traditional academic activities. This is not to say that there are no differences between impact and academic research– as shown in the preceding sections, they are based on different understandings of science. However, this filtering of different practices based on institutional support inevitably – as will be shown in detail in Chapter 5 – resulted in interpreting the logics, on the individual level, as separate.

Along with the developments discussed in this and the preceding sections came new vocabularies of practice. The early documents (Cabinet Office, 1993) mainly discussed technology and knowledge transfer, but also used such terms as research dissemination or communication. Some of these terms fell out of favour – for example, dissemination and knowledge transfer were perceived as inadequate for capturing these processes, as they assumed a more passive role for research that could travel between the social settings, rather than being constructed and reconstructed in a non-linear way (Davies, Nutley, & Walter, 2008). The critique stemming from academic circles soon led to changes in the language used in the research funders' guidelines and strategic documents (ESRC, 2009, 2013, 2015b).

[18] See for example the University of Edinburgh: https://www.ed.ac.uk/human-resources/pay-reward/promotions-grading/academic-staff/procedures-criteria [accessed: 28.08.2018

[19] See for example: http://webarchive.nationalarchives.gov.uk/20180319120947/http://www.hefce.ac.uk/ke/heif/strategies/ [accessed: 28.08.2018]

By the mid-late 2000s, "knowledge exchange" emerged as the key term used to capture practices aimed at securing social and economic benefits from research and "research impact" to express the idea of measurable outcomes of these activities[20]. The emergence of these new vocabularies is significant, as these vocabularies are building blocks creating collective meanings and cultural practices (Thornton, 2012). By categorising complex social phenomena, these new vocabularies not only provide social actors with a common ground for understanding the world, but also guide their practices, decisions and even identities (Hacking, 2007).

Finally, a development that helped to shape not only the impact agenda but also the practices of engaging with non-academic actors was the influx of research on knowledge exchange and impact. Over the last decade research funders, including both research and funding councils, were investing research funds into the process of knowledge exchange between academia and non-academic partners, resulting in a number of studies exploring the process of achieving and measuring impact (e.g. Davies, Nutley, & Walter, 2005; ESRC, 2009; Lightowler & Knight, 2013; Meagher, Lyall, & Nutley, 2008; Molas-Gallart, Tang, & Morrow, 2000). This led to the stimulation of this field of research, but also to the creation of multiple guidelines and sets of good practices that presented research-based recommendations for academics willing to engage with external audiences[21]. Currently the vast majority of the big public funders offer such guidelines, often linked with funding applications[22] or toolkits[23].

2.7. CONCLUSIONS

This chapter aimed to set the scene of this project and introduce key analytical concepts. Firstly, it summarised debates on the relevance of science and paradigmatic changes in approaches to science funding. Secondly, it explored these debates in the empirical setting of the research impact agenda. This chapter has argued that the impact agenda is more significant than a mere change in funding and assessment

[20] For example: https://www.ukri.org/innovation/excellence-with-impact/ [accessed: 28.08.2018]
[21] For an overview see: http://www.hefce.ac.uk/media/HEFCE,2014/Content/Pubs/Independentresearch/2016/Two,reports,on,KE/2016_kepractice.pdf [accessed: 28.08.218]
[22] For example: http://www.rcuk.ac.uk/innovation/impacts/ [accessed: 28.08.2018]
[23] For example: http://www.esrc.ac.uk/research/impact-toolkit/ [accessed: 28.08.2018]

criteria, as it has led to widespread changes in the understanding and practice of science. The value of science is no longer perceived as residing in its provision of a background of knowledge for policymakers and practitioners to draw on; rather it is seen as embodied in direct interaction with economic and policy processes. This perception has been followed up by changes in the funding and governance of science, in the incentives systems, and in the cultural and symbolic norms, framings and theories that guide academic practices. The institutional logic of impact has been institutionalised and reproduced in regulations, structures and strategies.

At the same time, this newly emerged institutional logic is (at least at times) in conflict with a pre-existing institutional logic – a logic of excellence which has traditionally guided academics in their practice of producing high quality scholarship. As a result, universities are increasingly expected to be hybrid organisations in which the two logics co-exist. As highlighted in this chapter, the way universities responded to changes in funding (particularly the REF), and the way they manage impact, are enhancing the competition between, and separation of, the two logics, as knowledge exchange and impact are largely separated from traditional knowledge production (for example in organisational support or available resources).

By exploring the conceptual and historical approaches to research funding, this chapter has highlighted the key framing of academic practices employed in this thesis: one that sees academic engagement and impact as encultured and shaped by institutions. Therefore, the understanding of knowledge exchange and impact practices, and more broadly the understanding of integration and separation models of science and policy, require exploration of the ways in which institutions operate and change. Chapter 3 will focus on the substantive literature on knowledge and policymaking. In the empirical Chapters 5 to 7 I will do that by focusing on the "micro-foundations" of institutional changes (Powell & Colyvas, 2008), and the process whereby individuals within institutions, through such processes as sense-making (Thornton et al., 2012; Weick, 1995; Weick, Sutcliffe, & Obstfeld, 2012), are shaping the ways institutions operate and change.

CHAPTER 3
LITERATURE REVIEW OF KNOWLEDGE AND POLICYMAKING

3.1. INTRODUCTION

The previous chapter has outlined the science policy background in which knowledge exchange organisations operated. It explored how the concept of relevance is institutionalised in the UK research funding system. This chapter will continue this discussion by exploring the ways in which the relevance of science is conceptualised and enacted in the policy setting. In particular, this chapter will summarise the substantive literature on knowledge in policymaking to which the thesis contributes. The goal of this chapter is two-fold: firstly, it will summarise the existing literature and debates on knowledge, evidence and experts in policy; secondly, it will identify the key gaps in the literature that this thesis will aim to address. Hence, the chapter will focus on three areas: 1.) evidence and its power to convince; 2.) experts and their cognitive authority; and 3.) evidence use and its technocratic, social and political determinants.

The main puzzle of this thesis, as set up in Chapter 1, was that of the co-existence of separation and integration of science and policy. In this chapter I will illustrate not only that this tension is central in the area of evidence use and knowledge exchange, but also that it is more nuanced in this area as compared to science policy, as the boundaries between separation and integration in this setting are not always clear-cut. In literature on knowledge and policymaking, the tension between the separation and integration of science and policy is mostly embodied in the interaction between scientific and social/political models of authority and of the value of knowledge and experts.

Any analytical framework is by its nature exclusionary. In shedding light on some strands of literature, one ignores others. In this thesis I decided to exclude two strands of literature which, to a substantial degree, engage with the notions of science and policy. The first strand consists of literature aiming to answer the question “What is

knowledge?", therefore presenting in-depth considerations of different typologies of knowledge and epistemic qualities of different types of knowledge (for a review see: Freeman & Sturdy, 2014; Maybin, 2016). Even though this strand of literature is potentially useful, the empirical and conceptual puzzle outlined in Chapter 1 has gone beyond these theoretical underpinnings and instead has explored ways in which knowledge is produced and used, rather than what knowledge is.

The second strand of literature that I have decided not to include consists of in-depth consideration of theories and empirical studies exploring policymaking; for example, theories of policy change (for a review see: Cairney, Studlar, & Mamudu, 2012). Even though this approach would also be potentially fruitful, in my analysis I aimed to shed light on the roles of academics in policy decision-making, as this was one of the main gaps identified in the preliminary review (see the discussion in Section 3.6 on gaps in the literature). Therefore, I chose to explore the ways in which academics are trying to influence policies, rather than to focus in detail on the ways policies change.

3.2. EVIDENCE IN POLICY

The existing literature on evidence – and more generally, knowledge – in policymaking is broad and dispersed. But even in this complex setting, one assumption cuts across different disciplinary and epistemic divisions: that there is no one type of evidence or knowledge in policy but rather a multiplicity of different forms of knowledge and knowing (Freeman, 2007; Maybin, 2016; Radaelli, 1995; Whitehead et al., 2004). The literature is less unified when dealing with ways in which this diversity of types and forms of knowledge should be organised (Freeman & Sturdy, 2014). For example, Freeman and Sturdy (2014) identified existing categorisations of knowledge based on the process by which it has been produced or the qualities of the holder. Therefore, knowledge can be categorised by drawing a distinction between scientific and experiential knowledge (Fleming & Rhodes, 2017) and by distinguishing between various types of knowledge according to the position of the producers of knowledge. Here relevant distinctions include, for example, expert knowledge vs lay knowledge (see: Epstein, 1995; Meriluoto, 2018; Stirling, 2008; Wynne, 1992); or expert vs practice-based knowledge (Barkham & Mellor-Clark, 2003; Green, 2006, 2009). Other categorisations focus on the roles the evidence plays in the policymaking

process; hence the types of evidence within such a categorisation include impact evidence, implementation evidence, attitudinal evidence, economic evidence and ethical evidence (Hansen, 2014). Despite these categorisations, in the practice of policymaking these different types of knowledge intertwine and interact with each other (Freeman, 2007; Freeman & Sturdy, 2014; Maybin, 2016).

At the same time, these different types of consideration point to the broader understanding of what knowledge is in policymaking. This point was central to Claudio Radaelli's 1995 seminal paper "The role of knowledge in the policy process". In this paper Radaelli (1995) explored the variety of different understandings of both knowledge and knowledge use in different theoretical approaches to policy research (evaluation research, epistemic communities, diffusion of economic policy paradigms, agenda-setting and policy learning). Radaelli advocated an approach to policy research in which knowledge is seen as the central feature of policy work. Writing more recently, Jo Maybin (2016) explored the knowledge work of civil servants in the Department of Health in England and discovered that they engaged in a multiplicity of different forms of knowledge work, not only "evidence". These more pluralistic approaches to knowledge have led to a reconceptualisation of evidence in policymaking in order to encapsulate not only different types of evidence but also different forms of knowledge: for example, practice-based knowledge or tacit knowledge (Sanderson, 2006).

In the context of this thesis, it will be crucial to explore the relationship between evidence and scientific knowledge more broadly. Even though this issue is often overlooked in the literature (similarly to the difference between expertise and knowledge discussed in the following section), there is a good basis for assuming that a difference does indeed exist between scientific findings and evidence. Notably, this issue was discussed by Majone (1989), who claimed that the difference between the two lies not in some objective differences in content of information, but rather in the argumentative power of the different types of knowledge. Therefore, instead of focusing on the varied typologies of research in policymaking, I will organise the literature based on the modes of conferring authority on evidence. I will do so based on two types of approach: 1.) based on the perceived reliability of evidence; 2.) based on the perceived fitness to the context.

3.2.1. Reliability of evidence and orderings of knowledge

The first mode of assuring the authority of evidence is based on its scientific reliability. This approach is most notably employed in the literature and practice of evidence-based policymaking. This logic of decision-making assumes that policy decisions should be based on, or at least informed by, evidence (often understood as scientific evidence) (Cabinet Office, 1999). This is because the use of evidence is supposed to minimise the uncertainty of decision-making and therefore improve the quality of decisions. Decisions reached through the exercise of evidence-based logic draw their legitimacy and accountability from the seeming objectivity of the evidence (Montuschi, 2009). Furthermore, considering the direct link between evidence and decisions, the quality of the evidence is held to have a direct impact on the quality of the policies that are based on such research.

The logical consequence of such an outlook is that evidence with the highest level of reliability and objecitity will be the most effective at minimising uncertainty. A dominant suggestion for dealing with this issue is to rank different types of evidence in terms of their reliability relative to each other (Montuschi, 2009). These so-called "hierarchies of evidence" stem from evidence-based medicine movements and posit randomised control trials (RCTs) and systematic reviews/meta-analysis based on these types of evidence being produced in a randomised and de-contextualised way (Cairney & Oliver, 2017). According to this view, the types of evidence at the top of the hierarchy are more reliable (and consequently of better quality), while those further down possess a decreasing level of reliability – and along with the decreasing level of quality, a decreasing level of certainty of knowledge and presumed quality of policies based on this type of knowledge (Evans, 2003). An example of the hierarchy (Petticrew & Roberts, 2003) is presented in Table 4. There are multiple different versions of hierarchies (Evans, 2003); for example, one for qualitative health research (Daly et al., 2007), and others incorporating observational studies (Hoppe et al., 2009). Some posit RCTs at the top of the hierarchy, while others prioritise systematic reviews (Evans, 2003).

Table 4. An example of a hierarchy of evidence adapted from Petticrew & Roberts, 2003.

Level	Method
1	Systematic reviews and meta-analyses
2	Randomised controlled trials with definitive results
3	Randomised controlled trials with non-definitive results
4	Cohort studies
5	Case-control studies
6	Cross sectional surveys
7	Case reports

Nevertheless, the overall assumption behind these types of classifications is uniform – more standardised formats of knowledge production, such as systematic reviews or RCTs, are more reliable. As argued by Montuschi there are three logical conclusions stemming from the hierarchies of evidence:

> (1) Evidence is whatever appears on the list;
> (2) The strength of evidence depends on the place a method has on the list;
> (3) The recommended form of evidence amounts to something like "go with whatever appears at the top of the list". (Montuschi, 2009, p. 429)

One of the consequences of the hierarchies of evidence outlook is promotion of the use of RCTs in policymaking as the most reliable form of evidence production (Cairney & Oliver, 2017; Pearce & Raman, 2014). Despite its popularity, this model of argumentation is widely criticised as unfit for policymaking. There are three main types of argument against prioritising RCTs in policy: arguments regarding the fitness to specific types of questions; arguments regarding the democratic character of policymaking; and arguments regarding the practicality of the decision-making process.

Arguments in the first group question the validity of RCTs as the best method of studying different phenomena. RCTs are often termed the "gold standard" of research as they constitute the reliable method for exploring causal inference (Cartwright, 2007). RCTs gained their special position because, in comparison with observational studies, they do not require prior information or expert knowledge and are more resistant to manipulations such as p-hacking (Deaton & Cartwright, 2018). The

methodological critiques of this view claim that this special position of RCTs is not justified. As argued by Deaton and Cartwright:

> Which method is most likely to yield a good causal inference depends on what we are trying to discover as well as on what is already known. When little prior knowledge is available, no method is likely to yield well supported conclusions. […] [D]epending on what we want to discover, why we want to discover it, and what we already know, there will often be superior routes of investigation and, for a great many questions where RCTs can help, a great deal of other work – empirical, theoretical, and conceptual – needs to be done to make the results of an RCT serviceable. (Deaton & Cartwright, 2018, pp. 2-3)

Therefore, the overall argument in these types of critiques relates to the privileging of RCTs as the most reliable research method, when in fact they are fit for purpose for very specific types of questions under specific conditions (Cartwright, 2007; Petticrew & Roberts, 2003). Hence, RCTs should not be considered the ultimate source of answers to all possible questions; a more nuanced methodological approach would be more appropriate (Booth, 2010; Cartwright, 2007; Petticrew & Roberts, 2003). The methodological debates over RCTs challenge the validity of the hierarchies of science from the point of view of the epistemic qualities of the knowledge produced. In turn, the remaining two arguments opposing the hegemony of RCTs are based on more social and political considerations of ordering knowledge in policy.

The second group of arguments discuss the exclusionary character of RCTs (and hierarchies of evidence more broadly) when posited as the most reliable (and prioritised) form of evidence. Newman (2011) argued that organising evidence into hierarchies would necessarily lead to an assumption that some forms of evidence are regarded as better and – consequently – as producing better policies. Therefore, the hierarchies of evidence in policymaking not only organise evidence but also exclude some forms of it (since what is not on the list is not considered evidence). Consequently, the hierarchies of evidence draw boundaries between valid and invalid forms and producers of knowledge in policymaking (Montuschi, 2009). Assessing evidence purely in terms of its scientific reliability inherently promotes an idea of policymaking as a realm of policymakers and academics. By doing so, the hierarchy of evidence models rest on the assumptions of the two-communities model (Caplan, 1979, see: Section 3.4.1): the forms of evidence that are at the top of the hierarchy are

those produced within universities or research-intensive institutions; therefore, the main producer of knowledge is an academic who can conduct the RCT or a systematic review. As such, the hierarchies of knowledge entail inherent categories of the producers (academics) and users (policymakers) of knowledge, and exclude non-technocratic forms of knowledge, such as those based on experience (Newman, 2011).

The third group of arguments discuss the false assumptions about policymaking that are implicit in the hierarchies of evidence. Focusing on reliability of evidence embedded in the hierarchies of evidence neglects other criteria of usability of evidence, namely its relevance or effectiveness (Booth, 2010; Cairney & Oliver, 2017). It is important to highlight that RCTs and hierarchies of evidence in evidence-based medicine are used to assess the effectiveness of interventions and that this is their main goal (Petticrew & Roberts, 2003). But not all policy problems have a structure of simple interventions (in fact, very few do). The effectiveness of hierarchies of evidence is doubtful when faced with more complex policy problems (Greenhalgh & Russell, 2006). As argued by Cartwright (2007), scientific evidence, as described in the philosophy of science (i.e. based on a probabilistic relation between hypothesis and evidence), differs significantly from evidence in the context of policymaking (Montuschi, 2009). Theories of probability are aimed at assessing evidence in terms of a degree of certainty (Cartwright, 2007). However, decisions in policymaking are based on the probability of the outcome of the policy, rather than on the probability of the certainty of the evidence (Montuschi, 2009).

Furthermore, few policies are developed on the basis of a single piece of evidence, no matter how reliable. Rather, it has been suggested that the evidence used in policy could be better understood as an "evidence jigsaw" (Whitehead et al., 2004). Even when the evidence is reliable, that does not mean that it has the power to shape policy decisions. As Jasanoff (1990, p. 234) pointed out, "when stakes are high enough, no committee of experts, however credentialed, can muster enough authority to end the dispute on scientific grounds". The focus on evidence and evidence hierarchies fails to acknowledge the inherently political nature of policymaking. By presenting a seemingly "technocratic" approach to governing, the evidence-based policy approaches to governing in fact suppress a debate over the politics of the process

(Greenhalgh et al., 2011; Greenhalgh & Russell, 2009; Morgan-Trimmer, 2014; Sanderson, 2009; Smith, 2013a).

3.2.2. Evidence that fits

As discussed in the sections above, assessing evidence in terms of its scientific reliability might be problematic as regards both the usability of such evidence in policymaking practice and its implicit politicisation. Another strand of literature – and one discussed in the following sections – takes a broader approach to framing the usability of evidence: one in which the authority of evidence does not stem directly from its inherent qualities but rather from its fitness to existing political and social processes. This section will explore this approach to evidence and policymaking, in which decisions are made on multiple different grounds other than scientific reliability and objectivity of evidence. In this section, I will focus on three such criteria: appropriateness to the policy setting, persuasiveness of the evidence for changing policy decisions, and legitimacy of evidence in policymakers' perception.

3.2.3. Appropriateness

Research discussed in this section takes a more nuanced approach to the notion of "evidence", advocating the employment of methods of assessing evidence that look beyond the simple question of its reliability. This strand of research argues that evidence should be selected not just on the basis of its epistemological qualities, but rather on its appropriateness to policy processes. Scholars putting forward these types of arguments call for acknowledgement of the deeply political nature of policymaking. As highlighted by Hawkins and Parkhurst (2015, p. 576): "Politics then is not a barrier to evidence use, but the defining character of the environment in which evidence is used". Hawkins and Parkhurst (2015, see also: Parkhurst, 2017; Parkhurst & Abeysinghe, 2016) propose that a way to approach this problem is to switch the focus from evidence use to "evidence governance". By drawing on the literature on governance and STS, Hawkins and Parkhurst (2015, p. 583) propose a framework for assessing the good governance of evidence including: appropriateness, accountability, transparency and contestability. Appropriateness refers to choosing evidence on the basis of its relevance to a specific setting, rather than according to universal criteria of quality (i.e. hierarchies of evidence). Accountability refers to linking the evidence back

to the public in order to assure its democratic legitimacy. Transparency relates to the openness of the evidence process to public scrutiny. Finally, contestability indicates the openness of the evidence to challenge. Overall, the authors argued that the good governance of evidence should take account of the institutional setting of the policymaking and also should be institutionalised in order to be effective (Hawkins & Parkhurst, 2015; Parkhurst, 2017).

Similarly, Sanderson (2009) argued for a move from the instrumental rationality that underpins evidence-based policymaking (EBP) models towards a more adaptive and pragmatic understanding of the role of evidence in policymaking. This approach to EBP, according to Sanderson (2009), seeks a middle ground between, on the one hand, technocratic models of EBP, and on the other, a politicised model which assumes a limited influence of evidence on politics. The middle road approach proposed by Sanderson (2009, p. 711) is aimed at combining the complexity theory with pragmatism, based on the recognition that "policy making is not a 'technical' exercise in instrumental rationality but rather a domain of 'practical reason'". Therefore, the selection of evidence should be guided by practical consideration of the kinds of information that would be appropriate for a specific context.

The overall argument put forward in this strand of literature calls for the expansion of the notion of "good evidence" to account for the context in which the evidence would be used (Boaz & Ashby, 2003; Parkhurst, 2017), rather than basing it purely on the objective reliability of the evidence. The literature on knowledge exchange and utilisation seems to support the applicability of models based on the assumptions of appropriateness. Relevance of research findings to policy and practice problems is one of the factors most often cited as likely to increase the use of research by policymakers (Innvaer et al., 2002; Mitton et al., 2007; Oliver et al., 2014; Pentland et al., 2011). Relevant research is usually described in this strand of literature as knowledge that is "targeted" (Pentland et al., 2011) or "contextualised" (McCabe, Wallace, & Crosland, 2015) to the needs of the potential research users. One common recommendation here is to tailor the message stemming from research to the audience, in particular by including actionable messages (Mitton et al., 2007). As highlighted by Cairney et al. (2016), improving the uptake of evidence in policymaking requires the reduction not

only of uncertainty (for example in terms of supplying more evidence) but also of ambiguity, in terms of narrowing down the available knowledge base.

3.2.4. Persuasion

Another line of inquiry contesting the technocratic approach to policymaking mobilises arguments based on the persuasion of evidence, rather than its objectivity or reliability. Authors taking on this perspective approach the evidence-to-policy process not according to the technological/rational model but rather according to a view of it as a rhetorical-interpretative process – acknowledging that evidence is not objective but is subject to argumentative work and deliberation (Fischer & Forester, 1993; Greenhalgh & Russell, 2006; Majone, 1989; Stone, 1997). Greenhalgh and Russell (2006), in their work on systematic reviews, conceptualise the process of policymaking as a drama, arguing against the perspective of portraying this research method as a "view from nowhere". Instead the authors argue for an approach to systematic reviewing that is "pragmatic, pluralistic, context-sensitive and cutting its cloth according to local resources, needs, contexts and timescales" (Greenhalgh & Russell, 2006, p. 40).

A prominent proponent of such a view of policymaking was Giandomenico Majone (1989), who argued that policymaking is a discursive process based on dialogue and argumentation, as opposed to "technical" evidence. Majone (1989, p. 143) highlighted the complex normative, institutional and organisational context of decision-making, rather than seeing it as something that is solvable purely on the basis on the technocratic considerations. He recognised that evidence and argument differ significantly, the latter entailing "complex blend of factual statements, interpretations, opinions and evaluations" (Majone, 1989, p. 63). Hence, knowledge in policy (and more broadly speaking – decision-making) cannot be reduced purely to evidence but rather should account for more varied and persuasive epistemic contents.

One of the approaches to accounting for research, which also considers values, interests and contextual factors, is that of reconceptualising the form that evidence takes and its epistemic content. Here, scholars focus on stories (Matthews et al., 2017; Stevens, 2011), narratives (Boswell, 2014; Preston-Shoot, 2007; Schlaufer, 2016) or ideas (Baumgartner, 2013; Béland, 2009; Cambell, 2002; Smith, 2013a). Lavis et al.

(2003) argue that existing ideas regarding possible solutions are among the key determinants of the use of research in health systems, next to interests and institutions. Research evidence is inextricably linked with the existing narratives and ideas, be it through partly setting the agenda, arriving at solutions or even identifying legitimate actors (Schlaufer, 2016). Focusing on ideas and narratives enables researchers to explore how evidence, values and interests interact with each other in order to present acceptable and persuasive policy options (Smith, 2013b).

3.2.5. Legitimacy and credibility of evidence

The final approach to the authority of evidence focuses on the qualities of the conveyors of evidence and the evidence they produce: their credibility, trustworthiness and legitimacy (McEwen et al., 2008; Oliver et al., 2014; Pentland et al., 2011). The basic insight behind this line of inquiry into evidence authority is the fact that the use of evidence is largely determined by whether a piece of information seems to be credible and trustworthy. This is one of the key elements of the process of evidence uptake, for, as shown by Orton et al. (2011), trusting the source of knowledge might at times be more important than the scientific qualities of said piece of evidence.

Cash et al. (2003) outlined three aspects of research uptake in decision-making: credibility, legitimacy and saliency. Credibility, as argued by Cash et al. (2003), is assessed by a "proxy" of scientific process (which assumes that the knowledge is produced on the basis of science rather than interest), participants (expertise), and organisations who are engaged (judged by past success). Therefore, evidence is considered credible when it is seen as adhering to the norms of scientific knowledge production. Legitimacy, however, refers to the broader acceptability of evidence by the end users, for example through its alignment with the values, perspectives and concerns of the broader social environment in which the expert advice is being given. As summarised by Belcher et al. (2016, p. 12): "Whereas credibility refers to technical aspects of sound research, legitimacy deals with socio-political aspects of the knowledge production process and products of research".

The concept of credibility of evidence is to a degree characterised by its circularity, as the credibility of the researcher lends credibility to evidence (Contrandriopoulos et al., 2010; Mitton et al., 2007), but also, evidence might lend credibility to different participants in the knowledge-into-policy process (for example practitioners; see

McCabe et al., 2015). At the same time, the former process seems to be more salient, as the validity of evidence and the credibility of the conveyor of knowledge are not always related (Contrandriopoulos et al., 2010). This is because the process of assigning credibility is inherently social rather than purely scientific (Hilgartner, 2000; Jasanoff, 1990). This observation is central to the literature on expertise which will be discussed in the following section.

3.3. EXPERTS IN POLICY

The previous section has discussed two perspectives on the sources of epistemic authority of evidence in policymaking. The first was based on notions of the technocratic accountability of decisions, and assumes that evidence in policy should be assessed in accordance with objective fixed criteria of scientific validity. The other strategy assumed a less instrumental-rational perspective on policymaking and argued for criteria in research assessment that are based on the appropriateness of research to the policy setting, its persuasiveness and credibility. This section will continue the discussion in the latter vein by focusing more extensively on the characteristics of the producers.

The notion of "expertise" is not unequivocal, as the boundaries between different terms, such as "expertise", "knowledge" and "science" are often blurred in the existing literature. This lack of explicit conceptual differentiation between terms often makes it difficult to conceptually distinguish between scientists and experts (e.g. is every scientist an expert?) and the distinctive features of experts (e.g. does possession of a sufficient level of knowledge automatically makes one an expert?). Grundmann (2017, p. 26), in his recent paper covering different notions of expertise and policy in the STS literature, has summarised as follows the attributes of experts identified in the literature:

> (1) There is a fundamental difference between experts and non-experts; (2) experts are located in the professions and in science; (3) experts possess technical skills, including manual and intellectual skills; (4) experts are impartial which makes their advice trustworthy. (Grundmann, 2017, p. 26)

These four assumptions are widely held both in the literature and in public debate, even if there is evidence contradicting them (e.g. Epstein, 1995; Pielke, 2004; Turner,

2010; Wynne, 2007). In the following sub-sections, I will explore these assumptions in the context of experts providing advice to policymakers.

3.3.1. Experts and non-experts

Collins and Evans (2002, 2008) in their influential work argue that there are multiple different types of expertise, rather than a unitary model of it. The researchers differentiate between two types of expertise: interactional expertise – possessing sufficient knowledge and skills to interact meaningfully with other experts in the field, and contributory expertise – having sufficient knowledge and skills to make a contribution to the body of knowledge. Contributory expertise is a kind that is possessed by scientists themselves and gained by training and socialisation into a discipline (for example by gaining tacit knowledge through working with other academics). Interactional expertise is the kind that allows one to meaningfully interact with experts from areas other than one's own. Collins and Evans (2002), who called for a "normative theory of expertise" and a Third Wave in studies of expertise. They argued that in fact technical decision-making calls for a new approach to expertise, which would deal with the problem of extension – scoping the limits of public participation in expertise. According to Collins and Evans (2002), the final determination of expert advice (and valid knowledge) should happen amongst experts from a "core group" who could establish the facts.

This work on categorisation of the types of expertise and normative theories of expertise initiated a debate (Epstein, 2011; Jasanoff, 2003b; Rip, 2003; Wynne, 2003) in which two main types of critical arguments (at least among those that are relevant to the scope of this thesis) emerged. The first critique of Collins and Evans's work relates to its applicability to the policymaking setting, thus highlighting a limited view on policymaking implicit in their work. For example, Jasanoff (2003b; see also: Grundmann, 2017) pointed out that Collins and Evans's outlook privileges the scientific institutions as sites of knowledge production, whereas knowledge for policy is often produced elsewhere. Therefore, this outlook ignores the epistemic diversity of knowledge in policy (see: Section 3.2). In particular, Collins and Evans (2002, 2008), by positing a special role for scientific knowledge, reinforce the instrumental-technocratic model of decision-making (which assumes that the advice given by experts/scientists should form the basis of decisions). Furthermore, as argued by

Grundmann (2017), this approach blurs the boundaries between "knowledge" and "expertise" (as in the idea that any person possessing certain tacit or explicit knowledge is an expert), making it difficult to assess what qualities of experts make the knowledge useful or applicable in the policy setting.

The second line of critique entails looking into the definition of expertise, particularly in relation to science. Collins and Evans (2002) called for a special role of scientific expertise in society and opposed relativistic approaches to expertise that blur the boundaries between scientific and non-scientific expertise (Collins and Evans, 2002). Some argued (Epstein, 2011; Wynne, 2003) that Collins and Evans's (2002) model overlooks the key aspect of expertise – its attributional character. Grundmann (2017) summarises this problem as framing expertise as something that someone *has* rather than something that is *attributed* to a person. This approach is clearly challenged by work on so-called lay expertise showing that in fact the status of an expert does not stem directly from professional affiliations but rather is negotiated in the setting (Wynne, 1992). In her polemical essay Jasanoff argued that:

> expertise is not merely something that is in the heads and hands of skilled persons, constituted through their deep familiarity with the problem in question, but rather that it is something acquired, and deployed, within particular historical, political, and cultural contexts. (Jasanoff, 2003b, p. 393)

The assigned value of expertise stems from the symbolic standing of different types of knowledge and the selection of those which are recognised as having more value in society (Arnoldi, 2007). Hence, the expertise is "relational" (Grundman, 2017, p. 26) in the sense that it involves negotiation between experts and the recipients of the expert advice. Accordingly, STS scholarship highlights the contingency of expertise and its underdetermined, historically bounded character (Arnoldi, 2007; Epstein, 1995; Turner, 2010; Weingart, 1999). In other words, expertise is not a singular, objective characteristic but rather a multifaceted, institutionally and culturally determined concept. Consequently, different institutional settings would produce different configurations of expert status and authority (Jasanoff, 2005).

3.3.2. Science versus expertise

As argued in the preceding section, one of the challenges of conceptualising expertise in policy lies in the seeming distinction between scientific knowledge and knowledge that is usable in policy. The role of experts in the production of policy-oriented knowledge is discussed, for example, in literature on regulatory science (Irwin, Rothstein, Yearley, & Mccarthy, 1997; Pennell et al., 2013; Wilsdon & Doubleday, 2015). The first author to draw this distinction was Weinberg (1972), who distinguished between "science" and "trans-science". In his depiction, trans-science deals with questions that could be framed in scientific terms, but cannot be answered purely by science. A similar approach, in this case termed "regulatory science", was employed by Sheila Jasanoff (1990) in her seminal book "The Fifth Branch: Science Advisers as Policymakers". In her work on advisory committees to the US government, Jasanoff compared regulatory science with traditional science, highlighting how the two differ in terms of their goals, modes of production and assessment criteria. Knowledge needed to make policy decisions significantly differs from scientific knowledge, for example in terms of the type of problems being dealt with (cognitive vs normative), incentives, timelines, accountability standards, procedures and institutions (Jasanoff, 1987, 1990, 2011a). When discussing policy advisors, Jasanoff (1990, p. 229) acknowledged that they do not consider their work to be traditional science; rather "a hybrid activity that combines elements of scientific evidence and reasoning with large doses of social and political judgment."

Therefore, there is a difference between the notions of an academic/scientist and of an expert. An expert is someone who is asked to give a performance – to share his/her knowledge, give advice, etc. (Bijker et al., 2009; Hilgartner, 2000; Stehr & Grundmann, 2011). It follows that knowledge produced or shared by experts must provide a capacity to act (Grundman, 2017). Jasanoff (2011b) and Grundmann (2017) have argued that the role of an academic and the role of an expert are not interchangeable, as policy knowledge is not interchangeable with academic knowledge. According to this view, experts are seen as bridges between science and politics:

> Unlike scientists whose primary mission is fact-checking, experts are by definition boundary-crossers whose job is to link scientific knowledge to matters of social significance: they are the diagnosticians

> of public problems, the explorers of solutions and the providers of remedies. (Jasanoff, 2011b, p. 24)

Therefore, the key identifier of experts' knowledge work is the ability to reduce complexity and sort out relevant information, rather than to present all available scientific knowledge on a topic. Not all policy-oriented research is necessarily produced in the traditional "scientific" modes. There are multiple sites of knowledge production outside the universities: for example, those charged with research mandated directly by the government.

3.3.3. Impartiality and the cognitive authority of experts

As argued in the preceding sections, experts can play a significant role in the process of policymaking. However, the status of an expert is not given, but rather established and negotiated by actors involved in the process of problem-solving (Epstein, 1995; Jasanoff, 2005; Stehr & Grundmann, 2011; Wynne, 1992). And one way of asserting the authority of experts is by projecting the image of impartiality (see: point 4 in Grundmann's list on p. 79). The logic behind this claim to authority is based on the notion of experts' objectivity and presumed access to the "truth" about nature (akin to the reliability of evidence discussed in Section 2.2.1). This view presents experts as "speaking truth to power" – a Quaker saying used by Aaron Wildavsky (1979, see also: Price 1968) to express the role of scientific advice given from outside policy and political structures. This view (discussed in Chapter 1 Section 1.1) assumes that in order to be influential in policymaking, science ought to be separated from policy, as the main source of its cognitive power lies in presenting knowledge that is detached from the politics of policymaking or personal agendas.

This account has been challenged by multiple scholars who claimed that, in fact, the separation of science and experts from politics and power is not as clear-cut as it seems. For example, Weingart (1999) in his influential paper discussed two problems arising when the model of "speaking truth to power" is institutionalised: scientification of policy (and minimisation of its democratic legitimacy), along with politicisation of science (and minimisation of its technocratic legitimacy). The "speaking truth to power" understanding of expert advice is based on a problematic, linear model of advising, in which decision-makers outline the problems (and therefore involve

politics), experts give value-free advice (in a technocratic way), and then decision-makers make decisions (in a political way). Weingart (1999) criticises this model by observing that the notions of "truth" and "power" cannot be separated – either in terms of sequential stages or in terms of disentangling values from facts. The issues arriving on the agenda are often already shaped by scientific discourses rather than emerging purely from democratic political considerations.

Another important contribution to this strand of literature was made by Haas (2004) who took on the topic of "speaking truth to power" as a model of science-policy relations. He observed that: "commentators are increasingly sceptical about whether modellers and scientists are capable of developing truth, and whether power ever listens to them anyhow" (Haas, 2004, p. 569). Haas (2004) argued that science in policymaking is inherently political, as the decisions made on the basis of science could benefit some but not others. As such, the legitimacy of science is contested by the actors negatively affected by the decision (Haas, 2004; see also: Lidskog & Sundqvist, 2002). Science is used selectively to support political ideals and serve political interests, which are outlined outside scientific considerations. In order to ameliorate this problem, he proposes, instead of focusing on truth, focusing on usable science (see also: Lindblom & Cohen, 1979):

> In short, usable knowledge encompasses a substantive core that makes it usable for policy-makers, and a procedural dimension that provides a mechanism for transmitting knowledge from the scientific community to the policy world and provides for agency when theorizing about broader patterns of social learning, policy-making, and international relations. (Haas, 2004, p. 573)

Haas (2004, p. 576) also acknowledged that the autonomy of science (see also: Section 2.2.3) is the main source of its epistemic authority and argued for a separation of science from policy considerations in order to protect its influence.

Other scholars argued against notions of the impartiality of science, maintaining that expert advice is not in fact neutral or value-free (Nelkin, 1995). According to Weingart (1999, see also: Jasanoff, 1990; Majone, 1989), experts in policy have two interrelated functions: instrumental (through helping to shape effective solutions) and legitimising (through helping to validate the decisions in a technocratic sense). As such, scientific knowledge cannot be value-free, as it is often used to legitimise opposing policy options. As highlighted by Weingart, in situations of controversy, experts align with

existing political options, which challenges the notion that scientific knowledge is external to political debates. He argues:

> If scientific knowledge is linked in any way to "interests" (in policy-making), it is evaluated as supportive, contradictory, or even dangerous. Knowledge inevitably comes under these evaluative verdicts once it enters the public arena and is considered politically relevant. (Weingart, 1999, p. 156)

Nevertheless, impartiality of experts, even if empirically contested, is often framed as a key fundamental of the cognitive authority of experts (Douglas, 2009; Lacey, 1999; Turner, 2001). The notion of knowledge that is free from interests and political particularities is seen as one of the key epistemic advantages of experts in policy and the grounds for their privileged cultural positions (Jasanoff, 2005). This inherently paradoxical position of impartiality can be mediated by approaching it in terms of practice, rather than epistemic content of policy knowledge. A now classic study of this approach is Hilgartner's (2000) work on the work science advisory committees in "Science on Stage: Expert Advice as Public Drama". In this work, Hilgartner argues that advisors engage in a "social machinery of credibility" (Hilgartner, 2000, p. 146). Employing the dramaturgical metaphor (Goffman, 1956), Hilgartner argues that science advisors yield their credibility by separating the frontstage – a seemingly objective and unified body of advice – from the backstage of knowledge production, which is more disordered and ideologically and epistemically pluralistic. Therefore, experts achieve the epistemic gains of impartiality not by means of absolute departure from interests and values, but rather through careful "practices of objectivity" (Jasanoff, 2011c).

3.4. USING EVIDENCE

The preceding sections explored the variety of different forms of evidence, as well as diverse ways in which evidence is being assessed for policy purposes. Consequently, these different quality criteria would indicate a range of models for lending authority to evidence and legitimacy to decisions based on this evidence. This section explores this issue further by looking at the different ways in which evidence is used in policy. In order to do so, I will explore three strands of literature that examine different approaches to conceptualising the use of evidence in policy. Firstly, I will summarise

different approaches that fall broadly within the category of knowledge utilisation. This approach is concerned with increasing the use of evidence by policymakers and practitioners and is based on instrumental-rational assumptions regarding policy and evidence. Secondly, I will explore the approaches that look at evidence use in policy, acknowledging the social and political aspects of this process. Finally, I will explore the cognitive approaches, highlighting the role of learning by policymakers as the key mechanisms of research-based policy change.

3.4.1. Evidence use perspectives

The literature on uses of knowledge in policy seems to be, at least to a degree, influenced by political commitments to evidence-based modes of governance. Yet, the broader funding and policy support for evidence use was not stable but a subject of fluctuating support (Ingold & Monaghan, 2014; Monaghan, 2011; Smith, 2013a). For example, the 1960s brought about a paradigm promoting rational and evidence-based models of policymaking which led to a plethora of key publications on evidence usage published in the 1970s and early 1980s (Caplan, 1979; Weiss, 1977; Weiss, 1979, 1980), many of which remain relevant and are cited nowadays. One of the main problems explored by the scholars during the 1970s developmental era of evidence use was one concerned with the low direct uptake of academic knowledge in policy, despite an increase both in political commitment to evidence and in available resources. The 1970s exploration of this so-called "utilisation paradox" (see: James & Jorgensen, 2009) has led scholars to point to a more complex relationship between knowledge and policy, going beyond simple, instrumental implementation of evidence-based recommendations (Knott & Wildavsky, 1980; Weiss, 1977; Weiss, 1979). One of the most influential models developed in this period was Carol Weiss's (1979) typology of research uses in policy:

1. The knowledge-driven model, in which knowledge enters policymaking in a linear way (from basic research to applied research to development and application);
2. The problem-solving model, in which research is used to solve a particular policy problem based on recommendations derived from empirical evidence;

3. The interactive model, in which policy formulation is a result of non-linear and complex interactions between different stakeholders, such as policymakers, scientists, journalists, administrators, etc.;
4. The political model, in which research is used instrumentally to support pre-defined policy options;
5. The tactical model, in which ordering new research or waiting for new research results is used as a means of delaying policy action; and
6. The enlightenment model, in which research has a long-term influence on the way policymakers think about problems, thus impacting on the framing of issues and consequently leading to policy change.

This work has remained influential and was revisited in the 1990s and 2000s when the moves towards evidence-based medicine, initiated in the 1980s, were expanded to include evidence-based policy and evidence-practice in the late 1990s. The evidence-based policymaking movement (for example, in the UK: Cabinet Office, 1999, 2000) ignited interest in, but also provided political and financial resources for, the exploration of ways in which research use occurs and is evaluated. In particular, this new resurgence of interest in evidence use was not only concerned with the "utilisation paradox" but was also expanded by considerations of measuring and evaluating the uptake of evidence in policy (e.g. Daviter, 2015, Lyall et al., 2004; Molas-Gallart, Tang, & Morrow, 2000). Weiss's typology has been revisited and has since been simplified to highlight three overall types of research use in policymaking: instrumental (types 1 and 2), conceptual (type 6), and symbolic (types 4 and 5) (Amara et al., 2004; Dunlop, 2014; Lavis et al., 2003; Nutley et al., 2007). These three types of evidence use will be explored in detail in the following sections, combining the findings from both time periods discussed above.

Instrumental knowledge uses are aligned with the linear and technocratic logic of policymaking, in which knowledge is used directly to solve policy problems. Unsurprisingly, considering the debates summarised in Section 3.2, this type of research use is responsible for only a minority of research-based policy decisions (Amara et al., 2004). This observation was consistent with Weiss's own work, in which

she argued that common uses of research in policy entail providing decision-makers not with concrete solutions, but rather with a broader knowledge and ideas that could support the understanding of the problems (Daviter, 2015; Weiss, 1999, p. 146). Weiss differentiated between research use aimed at solving policy problems and research use aimed at understanding those problems:

> Evidence suggests that government officials use research less to arrive at solutions than to orient themselves at problems. They use research to help them think about issues and define the problematics of a situation, to gain new ideas and new perspectives. (Weiss, 1977, p. 534)

The conceptual (or enlightenment in Weiss's categorisation) uses of research entail more diffuse and long-term effects on policy. The key idea of the enlightenment/conceptual model of evidence use is the assumption that, over a longer period of time, research can indirectly impact on policy by changing the ways the decision-makers understand the policy problem (Weiss, 1977). Furthermore, according to Weiss, conceptual models of evidence entail an ability to critically challenge decision-makers' views, as research provides "social criticism" (Weiss, 1977, p. 544), regardless of the policymakers' delineation of problems or the immediate applicability of research results.

However, even though the conceptual/enlightenment models of evidence use are quite prevalent in the literature, the exact mechanism through which this type of research use operates is not clear (Landry et al., 2001a., 2004; Daviter, 2015). Weiss (1977) argued that the enlightenment model arises through "knowledge creep", a process in which knowledge slowly enters the policy discourse over a long period of time. Authors who subsequently looked at Weiss's model were not consistent regarding this model of evidence use. For example, Amara et al. (2004) argued that the underlying assumptions of this model are aligned with the "garbage can" model of policymaking (Cohen, March, & Olsen, 1972). Others (for example Daviter, 2015; Dunlop, 2014) argue that it is rather based on models of policy learning, as these rely more heavily on the individual and group process of acquiring knowledge.

Nutley et al. (2007) combined the typologies of instrumental/conceptual impact to propose research use as a continuum (Figure 1) between more conceptual uses (e.g. awareness, knowledge and understanding) and more instrumental uses (e.g. attitudes, perceptions, ideas, practice and policy change) (Nutley et al., 2007, p. 51). The authors

focus on the two-way continuum, rather than on stages of evidence uptake (discussed by Landry et al. (2001a) and entailing: transmission, cognition, reference, effort, influence, application) to highlight the iterative nature of the knowledge-to-policy process.

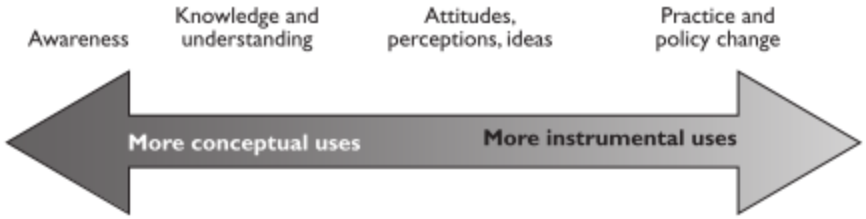

Figure 1. A continuum of research use developed by Nutley et al., 200, p. 51

Even though framing the evidence use process as a continuum overcomes the artificial dichotomies between instrumental and conceptual uses as well as the linearity of the stages models, there is one major problem with such a conceptualisation of evidence use. As highlighted in the preceding paragraph, instrumental and conceptual uses of evidence are based on different underlying models of the research-policy relationship (either the problem-solving model or the garbage can/policy learning model). Therefore, it is unclear whether the different types of evidence use are in fact the products of one mechanism or rather represent a multiplicity of overlapping processes. Arguably, one of the key lessons stemming from categorisation of evidence uses into conceptual, instrumental and symbolic is the necessity of further theorising them, particularly in terms of various processes behind them (for a notable exception, see: Dunlop, 2014).

Landry et al. (2001b) put forward the idea that there is a need for further exploration of the mechanisms and interactions that knowledge utilisation consists of. The authors categorised the literature on knowledge utilisation into groups that assume either "science push" or "demand pull". Science push models posit academic researchers as the main source of policy ideas. These models focus on the qualities of research (such as research content or research type) in order to determine the probability of the uptake of research in policy. At the same time, as highlighted by Landry et al. (2001b), such a focus overlooks the interactive and processual aspects of knowledge uptake, in that knowledge does not just automatically enter policy based on the merits of the research.

Furthermore, the authors argue that the science push perspective overlooks the need to transform knowledge if it is to be taken up in policy. These two problems are addressed by the "demand pull" models, which posit the policymakers as the main initiators of ideas for policy, so that the research uptake would increase if the needs of the policymakers were more closely met (as opposed to considerations of the academic value of research). The problem with this model, according to Landry et al. (2001b), is that even research tailored to the needs of policymakers might not be taken up in decision-making, because of political and organisational considerations and interests. Landry et al. (2001b) argue that, instead of focusing on the qualities of research itself, the research should focus on the social behaviours of actors involved in knowledge utilisation, as these form the better predictor of whether the evidence will be taken up in policy.

The focus on interaction between academics and policymakers is one of the premises of the "two-communities" model (Caplan, 1979). This framework assumes that the main problem with uptake of research in policy has to do with the cultural differences between policymakers and academia. Neither group can effectively communicate with the other, because of the epistemological difference between the academic understanding of knowledge and the policy uses of knowledge. Caplan's solution was to increase the interaction between scientists and policymakers and to adapt the language in which academics disseminate their results. At the same time, Caplan acknowledged that increased interaction between the two groups is not unproblematic, because of the politics of policymaking:

> The need for reciprocal relations between knowledge producers and knowledge users in policy-making positions is clear, but the problem of achieving effective interaction of this sort necessarily involves value and ideological dimensions as well as technical ones. (Caplan, 1979)

The two-communities model is simultaneously criticised in the literature (Phipps & Morton, 2013; Smith & Joyce, 2012; Wehrens, 2014) but also (implicitly or explicitly) used in multiple different areas of research and practice. The critics of this model highlight that categorising the broad spectrum of actors involved in policymaking into two groups leads to over-emphasis on the homogeneity of these groups, along with under-emphasis on the heterogeneity within them (Wehrens, 2014). The policymaking spectrum does not consist of one boundary between science and policy, but rather of

multiple professional, political and epistemological boundaries (Smith & Joyce, 2012). Additionally, the problems with low uptake of evidence cannot be solved by a simple increase in communication, as it is more complex and dependent on many different factors – both political and epistemological.

3.4.2. Social and political perspectives on evidence use

One of the problems with the knowledge utilisation/research use perspectives is their framing of more value- and interest-laden uses of research (types 4 and 5 in Weiss's categorisation) largely in terms of a "misuse" of research (Nutley et al., 2007). In contrast to these models, the approaches discussed in this section look at evidence use as an inherently social and institutional process, which is determined by broader factors and involves multiple different actors.

This perspective, in its most radical form, was presented by Collingridge and Reeve (1986), who argued that meaningful interaction with evidence in policymaking is impossible, as the engagement between science and policy is always both "under-critical" and "over-critical". Collingridge and Reeve (1986) maintained that scientific research might be used under-critically to legitimise pre-existing decisions or political consensus. Furthermore, academic research can be used over-critically to ignite a never-ending debate between experts, and – consequently – delay the decision indefinitely. In acknowledging this, Collingridge and Reeve (1986) point to the "ironic" role of evidence in policymaking, which can be used not to make but rather to delay decisions. As highlighted by the authors:

> Research on one hypothesis ought to cancel out research on others, enabling policy to be made which is insensitive to all scientific conjectures. (Collingridge & Reeve, 1986, p. 32)

As highlighted in the quote above, one of the characteristics of research is that it can produce almost unlimited knowledge claims which might contradict each other. Therefore, any policy can be supported by scientific research and these different pieces of research might "cancel each other out" – leaving the policy to be decided on the basis of factors other than scientific. Seen from this perspective, evidence-based policymaking is political because any decision might be supported with evidence which might be termed "policy-based evidence" (Hunter, 2009).

A similar notion of science as potential political ammunition was advanced by Daniel Sarewitz (2000, 2004), who argued that the problem with science stems from its ability to generate a plethora of "facts" which could then be used by different sides of a policy contestation. As a result, the policy debates are "saturated with objectivity" (Sarewitz, 2000, p. 81) and science is unable to resolve the controversies. These types of argument pose an important challenge to instrumental-rational models of policymaking by showing the limited power of science to solve policy problems. At the same time, authors discussed in this section based their work on an analysis of contentious environmental policy areas and might have overgeneralised from areas containing high levels of controversy onto all policies. In reality, there are cases in which science and/or policy controversies have been settled either by new knowledge or by a consensus achieved after a prolonged period of technical debate (Grundmann & Stehr, 2012).

A more nuanced approach to political uses of research was presented by Christina Boswell (2008, 2009b), who argued for approaching the political uses of research as an everyday reality of policymaking, rather than as a "misuse" of research. Boswell, drawing on political and organisation studies, maintained that the type of use of evidence within policy is closely connected to the legitimising mechanisms of the larger context in which the organisation operates. For example, action-oriented organisations will use evidence more instrumentally, whereas politically-oriented organisations will use it to legitimate their work. Boswell (2008, 2009b) differentiates between two types of political functions of research: the legitimising function of presenting the organisation as research-intensive, and the substantiating function of providing arguments in debates over contested issues.

The social and political determinants of knowledge production and use were also put forward by Peter Haas (1992) in his prominent work on epistemic communities. This framework assumed that knowledge is being produced and shared in (international) policy through networks of experts. These experts have "authoritative claims" (Haas, 1992, p. 3) to knowledge – entailing not only academic knowledge but also persuasive power over the interpretation of that knowledge. As argued by Haas (1992), the members of epistemic communities do not need to have the same disciplinary background, but they do have to share common values and beliefs, as well as the

general understanding of causes and effects in specific areas and shared practices of validating knowledge. The epistemic communities framework remains influential, as it highlights the networked approaches to knowledge work and allows for combining knowledge and non-knowledge based arguments and values in the work of policy experts. At the same time, the underlying assumption of this framework is that of the separation of experts and policymakers (which is understandable considering Haas's appreciation of the autonomy of science; see Section 3.3.). More complex approaches (Hajer, 1993; Smith & Joyce, 2012) show that in fact the professional boundaries between different groups of actors might align around a variety of factors (e.g. epistemological or political dimensions).

3.4.3. Policy learning perspectives

This section has thus far discussed two types of approach to understanding evidence use: one grounded in rational-instrumental models of evidence use, and one grounded in understanding of this process as inherently social and political. The third group of approaches assumes evidence use as a cognitive process and focuses on policy learning as the main impetus for policy change. The policy learning approach to policy change has been proposed by Hugh Heclo in his seminal work on social policies in the UK and Sweden. Heclo (1974) presented learning as the key mechanism of policy change by juxtaposing it with the then dominant perspectives on policy which assumed conflict as a central feature of policymaking:

> Tradition teaches that politics is about conflict and power ... This is a blinkered view of politics and particularly blinding when applied to social policy. Politics finds its sources not only in power but also in uncertainty – men collectively wondering what to do ... Policy-making is a form of collective puzzlement on society's behalf. (Heclo, 1974, p. 305)

The view of policymaking as a "collective puzzlement" posits it as a social activity aimed at dealing with the complexity of social reality. Therefore, as highlighted by Bennet and Howlett (1992), Heclo saw learning as a response to changes in society, rather than as a conscious, planned activity. Policy learning, in Heclo's terms, is a way for policies to make sense of the changing environment and adapting to it (Bennett & Howlett, 1992).

A different approach to policy learning was employed by Peter Hall (1993) in his influential work on social learning and policy change. In contrast to Heclo, Hall sees policy learning as a more focused and deliberative practice (Bennet & Howlett, 1992). He adopted Kuhn's work on changing paradigms in science to explore the shift from Keynesianism to Monetarism in UK economic policy in the 1980s. Hall (1993) argued that policy changes occur on three levels. The first order of change comprises adjustments or modifications of already existing policy instruments. The second order of change entails the introduction of new policy instruments but within an unchanged hierarchy of goals. Finally, the third level of change entails radical change, which includes adapting the policy instruments, introducing new instruments, and changing the hierarchy of goals behind the policy. In this model, learning might be more incremental or radical, depending on power relations between different groups. Shifts in paradigms would also entail a reshuffling of the dominant experts advising the government and shifts in the authority of different groups. Finally, according to Hall, experimentation and failure are of key importance in the process of changing paradigms, as these processes will unveil the inadequacy of the dominant paradigm.

Another important contribution to policy learning literature is Paul Sabatier's and colleagues' work on the Advocacy Coalition Framework (ACF) (Sabatier & Jenkins-Smith, 1993; Sabatier & Weible, 2007; Weible & Sabatier, 2009). According to this framework, policy learning occurs in Advocacy Coalitions which are formed around shared policy beliefs within policy subsystems (as policies are produced in complex subsystems, rather than single institutions). A belief system – central to the ACF framework – comprises a three-level hierarchical structure: deep core beliefs, consisting of fundamental axioms; policy core beliefs, consisting of policy strategies and positions; and secondary core beliefs, consisting of instrumental tactics which can be employed in decision-making (Sabatier & Jenkins-Smith, 1993). The belief system is central both to the policy learning and change – as actors merge around common beliefs with the aim of forming policy solutions that will embody their beliefs (Sabatier & Weible, 2007). Expert and technical knowledge play a significant role in this process as policy actors draw on scientific knowledge in analysing problems and designing solutions (Weible, Pattison, & Sabatier, 2010). The coalition's belief system mediates the learning process and consequently the knowledge-based policy change is a long-term phenomenon (Sabatier & Jenkins-Smith, 1993). As such, learning within

coalitions is largely (but not exclusively) political - the actors within the coalitions will only accept evidence that aligns with their belief system. Deep core beliefs are positioned as resistant to change, so the ACF suggests that evidence contradicting a coalition's core values will be ignored or dismissed by members (Sabatier & Weible, 2007). Therefore, policy learning in ACF is a process involving the participation of multiple actors (Weible et al., 2010).

3.5. KNOWLEDGE BROKERS AND BOUNDARY WORK

As discussed in the preceding sections, knowledge use in policy is not linear and involves a complex set of processes and actors (Holmes et al., 2017; Nutley et al., 2007). One common recommendation for dealing with this complexity is to approach the matter from a structural point of view: namely, by establishing knowledge brokers, in dedicated posts, whose role is to facilitate research impact on behalf of researchers and research teams.

According to Hering (2015, p. 2), knowledge brokerage is "an iterative and bidirectional process of translation, tailoring of information for specific contexts, feedback and integrations". It is a multilevel process that can be assigned to individuals, organisations or even whole structures (Ward, House, & Hamer, 2009). Knowledge brokers' most important feature may be their "double peripherality" (Meyer, 2010); that is, their location on the periphery of policy and science. In many contexts, such a location is conducive to their activities, for example by making translation and mediation possible; but, at the same time, their position may make them less visible in the process (Meagher & Lyall, 2013). This factor may, in turn, make the task of gaining sufficient epistemic authority and challenge their expert position (Knight & Lightowler, 2010;).

Knowledge brokers operating in policy-related fields are required to possess skills related to analysing and transforming academic research, skills which are similar but not identical to the qualities of scientists themselves. As noted by Turnhout et al. (2013), knowledge brokers increasingly work within the process of producing research, as opposed to focusing solely on the results of such research. For instance, they involve stakeholders in the research process or communicate preliminary results

(Turnhout et al., 2013). An important aspect of this process is the development of shared questions between scientists and other stakeholders, which might represent a challenging process of formulating mutual understanding of policymakers' needs in a way that is understandable and relatable for scientists (Turnhout et al., 2013). Knowledge brokers should also have the ability to connect existing research to policy problems, in order to devise possible solutions (Sverrisson, 2001) and to take a broad overview of the existing research (Clark & Kelly, 2005). In order to successfully support the policymaking process, knowledge brokers ought to have expertise in areas related to both policymaking and knowledge production (Dobbins et al., 2009; Hering, 2015; Phipps & Morton, 2013). Lomas (2007) underlines the need to be entrepreneurial, and to have an advanced understanding of the different cultures of policy and science.

In order to effectively support knowledge exchange, knowledge brokers perform three types of tasks (Bandola-Gill & Lyall, 2017): tasks related to managing the format of research (e.g. providing summaries, recommendations, etc.); tasks related to building links between different actors within policymaking (e.g. linking experts and research users); and tasks related to co-producing knowledge for policymaking (e.g. helping to develop shared questions). One way of carrying out these tasks is via "boundary work", which will be discussed in the following section.

3.5.1. Boundary work

The concept of boundary work was introduced by Thomas Gieryn (1983) as an approach to identifying the difference between science and other areas of human activity. Science, as argued by Gieryn (1983), is not identified by any essential, inherent characteristic but rather is demarcated by the rhetorical work of different actors as means of securing influence and resources.

This constructivist approach has been usefully applied in understanding the difference between science and policy (Bijker et al., 2009; Halffman & Hoppe, 2004; Lövbrand, 2007). Boundary work in the policy area entails a demarcation of science – a representation of claims to objective truth – from policy, characterised by interests and politics (ibidem). The boundary between science and policy, even if it is constructed and rhetorical, rather than an actual division of these two spheres, plays many different

roles. On the most pragmatic level, such a division could help to divide labour between science and policy and to assign responsibilities for different elements of the science-into-policy process (Huitema & Turnhout, 2009). On the more conceptual level, such divisions play a role in differentiating between the "technical" and the "political", and therefore acting as lines of demarcation between knowledge and politics, fact and value, objectivity and interests (Turnhout, Hisschemöller, & Eijsackers, 2007).

At the same time, boundary work requires not only demarcation but also navigation of the boundary (Halffman & Hoppe, 2004), hence assuming the flexibility and hybridity of the boundary (Epstein, 2011). Carlile (2002) identified three types of difference in knowledge sharing across the boundary: semantic (different language), syntactic (different meanings), and pragmatic (different practices). The third type, according to the author, is the most difficult to change, as doing so would require an organisational change and the development of new practices. The approaches to boundary management include boundary objects (Star & Griesemer, 1989) or boundary organisations (Guston, 2001). In this approach, the central element of the science-policy boundary is its flexibility and the ability of some entities to be seen as legitimate by persons on both sides of the boundary.

"Boundary object" is a term introduced initially by Star and Griesemer (1989) in their work on the Berkeley Museum of Vertebrate Zoology. Star and Griesemer (1989) introduced this concept to explain ways in which people from different and intersecting social worlds can work together without achieving consensus but rather aim to achieve different goals aligned with different norms, practices, etc. This collaboration is enabled by boundary objects, such as specimens, fieldnotes or maps. Star and Griesemer described them as follows:

> Boundary objects are objects which are both plastic enough to adapt to local needs and constraints of the several parties employing them, yet robust enough to maintain a common identity across sites. They are weakly structured in common use, and become strongly structured in individual-site use. They may be abstract or concrete. They have different meanings in different social worlds but their structure is common enough to more than one world to make them recognizable, a means of translation. The creation and management of boundary objects is key in developing and maintaining coherence across intersecting social worlds. (Star and Griesemer, 1989, p. 393)

Therefore, by their ability to be malleable and specific at the same time, the boundary objects enable collaborations in a way that does not require either side of the boundary to sacrifice its goals and understandings. Even though the meanings of the boundary objects might be different for different groups, they are useful and understandable to both sides of the boundary.

The analytical insights regarding cross-boundary cooperation enabled by boundary objects proved to be attractive to multiple bodies of scholarship, including science communication and information science. This popularity seemed to increasingly expand the usage of the boundary object as a conceptual framework, prompting Star (2010) to write a follow-up to the original work with the telling title "This is not a boundary object". In this article, Star clarified that the boundary objects are most useful at the organisational level of analysis and should be used to examine specific objects in context (rather than general ones like the Bible or a flag) in order to yield analytical insights.

Another influential approach regarding practices at the intersection of different social settings is that of boundary organisations. Boundary organisations are entities working on the periphery of two different social settings and charged with enabling the collaboration and interaction between them (McNie, 2007; Miller, 2001). According to Guston (2001), boundary organisations can achieve more stability in the cross-boundary setting than boundary objects because of three characteristics (Guston, 2001, pp. 400-401): firstly, they produce boundary objects and standardised packages; secondly, the boundary organisation involves actors from both sides of the boundary, as well as mediators; thirdly, these organisations are explicitly accountable to both sides of the boundary (e.g. science and policy).

As observed by Parker and Crona (2012), boundary organisations in the contemporary academic setting should be viewed as hybrid spaces (Miller, 2001), rather than as links between two specific groups of scientists and policymakers. This is because research is increasingly embedded in the social setting, with multiple links to non-academic communities (see the discussion in the preceding chapter on such models as Mode-2 science, Triple Helix or Post-Normal science). Consequently, the boundary organisations have accountability links to multiple communities (rather than just to science and policy) (Klerkx & Leeuwis, 2008b). Furthermore, the expectations of these

diverse groups might be incommensurable. The boundary organisations are under multiple tensions, including those between disciplinary and interdisciplinary knowledge, basic vs applied research, long-term vs immediately applicable research, or autonomy vs consultancy (Parker & Crona, 2012). Therefore, they require dynamic and flexible management and rewards systems, role adaptation, and learning (Klerkx & Leeuwis, 2008b; Parker & Crona, 2012). At the same time, through their links of legitimacy to both science and policy, boundary organisations might enable effective boundary crossing without sacrificing the stability of the boundary (Guston, 1999).

3.6. GAPS IN THE LITERATURE

The goal of this chapter was to review the relevant literature and in doing so to 1.) outline the backdrop of knowledge that frames the analysis presented in the subsequent empirical chapters, and 2.) identify the gaps in the existing literature. For these purposes, I have explored three different (although at times overlapping) strands of literature, discussing different forms of evidence, roles of experts in policymaking, and different conceptualisations of ways in which the evidence is being "used" by policymakers.

The first important gap stems from insufficient exploration of the perspective of academics in the process of knowledge exchange and creation of knowledge intended for knowledge exchange purposes. Despite a rich discussion on the diversity of forms of knowledge/evidence in policymaking, the diversity of academic knowledge is often overlooked. The researchers and experts discussed in the knowledge exchange literature are portrayed as a homogeneous group charged with producing uniform academic research, without consideration (for example) of different areas and disciplines. Furthermore, by focusing on the differences between "academic" and "policy" knowledge, the literature also overlooks the variety of types of knowledge produced by academic researchers. In the process, the literature (some of which has been discussed in this chapter) ignores the cultural and epistemic diversity of academia. For instance, knowledge produced in more applied fields is inherently normative and close to context (Roll-Hansen, 2017), which would posit it as closer to the "policy" knowledge described in Section 2.2, rather than to basic research, which is, as defined, focused on scientific description and decontextualisation of knowledge

(ibidem). The impact of this diversity on knowledge exchange practices and outputs is significantly underdeveloped in the knowledge exchange literature, which focuses more extensively on the format of research and its contextualisation than on the broader context of knowledge production.

The second gap in the literature that this thesis addresses is seen in the fact that, even though the literature provides a rich account of the different types of impacts and different types of evidence usage, it is not clear what mechanisms are driving different types of research use on the "supply" side of knowledge exchange. For example, problem-solving models of evidence use – and consequently instrumental impacts – would arguably be produced by different sets of practices and achieved through different mechanisms in contrast to more indirect enlightenment models aimed at conceptual impacts. However, despite multiple mappings of different types of policy problems (Michaels, 2009) or stages of policy (Turnhout, Hisschemöller, & Eijsackers, 2008), the notion of linking different knowledge exchange mechanisms to achieved outcomes is not sufficiently explored.

Finally, the last gap that this thesis examines concerns the legitimacy of knowledge exchange work for both academics and research users. As discussed in the literature, policymaking decisions draw on two competing sources of legitimacy: democratic legitimacy and technocratic legitimacy (Hawkins & Parkhurst, 2015; Jasanoff, 1990; Weingart, 1999). But what is not clear is how the process of knowledge production and exchange is legitimised in this setting. As an example, if science is lent authority by its objectivity, but at the same time increases its effectiveness through embodiment in the policy process, the model of legitimising (and de-legitimising) that guides the knowledge exchange process seems to be of key importance, as it is comprised of both knowledge production and application.

In other words, these gaps in the literature are directly linked with the research puzzle outlined in Chapter 1. The stance taken in this thesis calls for treating the tension between the technocratic and political/social models of science in policy as a phenomenon in its own right and a reality for the actors involved in knowledge exchange, rather than as a misunderstanding or misappropriation of either the science or the politics of the science-policy interaction. Based on the analysis of two main strands of literature: on evidence-based policymaking and on science policy (discussed

in the preceding chapter), this thesis proposes an examination of knowledge exchange that locates it within a constant struggle between autonomy from society and embeddedness in (and accountability to) society. Consequently, this theoretical position aims to move away from seeing autonomy from and embeddedness as contradictory or developmental but rather argues for this tension being one of their most intractable key elements.

CHAPTER 4

RESEARCH METHODOLOGY

4.1. INTRODUCTION

The previous chapters have introduced the research puzzle along with the conceptual approach I take to address it. So far, the thesis has discussed the science policy background of this project, as well as the literature to which this work contributes. Before turning to the discussion on substantive empirical findings (discussed in Chapters 5-7), this chapter will explore the methodological assumptions and research process that underpin this thesis. The chapter has two goals: firstly, to present a transparent account of the research process, particularly data generation and analysis, that is the basis of the subsequent chapters; secondly, to offer a methodological reflection on the process of data collection for this study and to identify lessons that could be learnt from this research project.

The following sections will explore the research design choices that aimed to support answering research questions outlined in Chapter 1 Section 1.2. In particular, I will discuss the epistemological and ontological underpinnings of this project, the research design choices guided by these philosophical reflections (particularly the case study design), and the data generation approach (interviews and document analysis). Throughout this chapter I will present a reflection on the issue of consent in qualitative research and the ways in which trust between the researcher, interviewees and gatekeepers mediates the ambiguities of consent in qualitative research.

4.2. THE INTELLECTUAL GROUNDING OF THE PROJECT

One of the factors – and arguably the most influential one (Carter & Little, 2007) – shaping the research design of this project was its epistemological and ontological underpinnings. As outlined in Chapter 1, the main puzzle this thesis aims to explore is that of the seemingly contradictory expectations of science to be simultaneously closely engaged with its social setting and autonomous from it. Therefore, the central problem of this study – regarding the usefulness of scientific knowledge in policy and practice – is one that is shared with the literature on knowledge utilisation and

exchange (see: Chapter 3 Section 3.4.). Nevertheless, the outlook employed in this study departs from the focus on the factors shaping and improving the uptake of knowledge in policy which is so central to the knowledge utilisation and exchange literature, dominated as it is by more positivist epistemologies and ontologies. Unlike such studies, this project is not oriented towards discovering facts external to the perceptions and meanings of involved actors. Quite the opposite. Grounded in – broadly termed – interpretivist epistemology, it is precisely aimed at exploring the *Verstehen* (Yanow, 2015): that is, the meanings and understandings of actors situated within meaning-making communities and sharing common repertoires of understandings. These repertoires are socially constructed and disseminated. This project's approach is close to Husserl's (1970) classic work on phenomenological inquiry, which focuses not on the object itself (in this case "research impact" or "knowledge exchange"), but on the process of making sense of this object and framing actors' experiences with the object. Therefore, this study does not aim to understand knowledge exchange itself as an objective phenomenon, but rather to explore the way the individuals involved in the process experienced it and how these experiences became the reality for the studied groups of researchers (see: Yanow, 2015).

Meaning-making is a "situated entity" (Yanow, 2015, p. 13) and as such it is contextualised by the person's previous experiences and the social and historical context of the phenomenon. This assumption is reflected in many aspects of this research. For example, this study has focused not only on different approaches to knowledge exchange but also on the historical and institutional context of the development of knowledge exchange as a science policy concept (discussed in Chapter 2) and on the organisational and individual factors shaping the perception of knowledge exchange as an academic practice (discussed in Chapters 5 and 6). As a consequence of this approach, what is regarded as reality might be perceived differently by different actors, and in turn, different actors' perceptions would be based on their perceived realities. Therefore, there is no one reality to be studied, but rather multiple realities (Adcock, 2015) and multiple interpretations of the social phenomena (Yanow, 2015).

Finally, these epistemological underpinnings of the PhD project discussed in this section lend themselves to a focus on practices. This is partly because a

phenomenological approach to social construction assumes a possibility of human agency, rather than a complete dominance of social structures. Even though structures are seen as socially constructed and undeniably powerful, there is still scope for individuals to affect and actively respond to their social background (Bevir & Rhodes, 2006; Hallett & Ventresca, 2006; Thornton et al., 2012). This approach to explaining social actions by assuming "situated agency" (Bevir & Rhodes, 2006; Thornton et al., 2012) – an assumption that individuals, while being constrained by structures, have agency to initiate changes and shape their social setting – lends itself to focusing on practices as a way of exploring the extrapolation of these individualised meanings onto groups and communities (Schatzki, Knorr-Cetina, & Savigny, 2001). As argued by Swidler (2001), the focus on practices allows one to conceptually switch from the level of conscious ideas and values to the level of those that are unconscious and habitual. Practices are therefore observable objects through which abstract ideas and meanings can be empirically examined. Furthermore, exploring different framings of social phenomenon (for example "knowledge exchange" as it is a case in this project) might be incomplete – it is practices that are needed to turn schemas and ideas into social reality (Swidler, 2001).

Overall, this project is based on the philosophical premises of social constructivism and interpretivism. Consequently, this project explains the social processes (such as knowledge exchange and research impact) by focusing on the meanings assigned by the actors (mainly academic researchers) to these concepts, as well as on the sets of practices that were guided by these understandings. The methodological choices, described in detail in the remainder of this chapter, are guided by and best suited to these assumptions.

4.3. RESEARCH DESIGN

4.3.1. Case study approach

Knowledge exchange as a phenomenon is complex and multifaceted. As the calls for increased engagement with non-academic actors became progressively diffused throughout different academic settings (see: review in Chapter 2 Section 2.4.1), the number of potential spaces in which the process of knowledge exchange took place amplified. Especially after the introduction of the Pathways to Impact and impact

element in REF 2014, knowledge exchange began to be perceived as expected of all academics, rather than something occurring in only in designated spaces. Therefore, the main objective in designing my research was to find an approach that would allow me to carry out a focused analysis but at the same time ensure the possibility of exploring the complexity and multifaceted aspects of knowledge exchange.

After considering different options (see: discussion below in Section 4.3.3), I have opted for a case study approach with a focus on knowledge exchange organisations which were publicly funded and located within universities. This decision was a result of two reflections: 1.) regarding the research design best fitted to study knowledge exchange; and 2.) regarding the type of setting that would be sufficiently self-contained to serve as the basis of an independent case. These two issues will be discussed in turn in the following sections.

Arguably, the most significant research design decision – and one with far-reaching consequences for the study – was to opt for a case study design. Nevertheless, this choice was relatively unproblematic, since this approach was particularly well suited to both the object of my study (knowledge exchange between science and policy) and the epistemological assumptions discussed in Section 4.2. Case study methodology is often cited (Creswell, 1998; Yin, 2003) as appropriate to an exploration of deeply contextualised settings, of which knowledge exchange is undeniably an example – see the discussion of the literature in Chapter 3. Additionally, the case study approach allows for the in-depth, multi-dimensional examination required for interpretive exploration, as discussed in Section 4.2. The case study approach is not a unitary one; but rather embodies an umbrella term for multiple different methodological approaches, with different goals, methods, and orientations. As per my research orientation, guided by the philosophical assumptions discussed above, I opted for Stake's (1994, 1995) approach rather than the popular Yin (2009) approach to case study research. Stake's approach is more unstructured and constructivist, as opposed to Yin's post-positivist and structured approach (Boblin et al., 2013). In the former, the study is not guided by a specific framework, but rather is aimed at a broad exploration of the process and "progressive focusing" (to quote Stake's (1995) use of Parlett and Hamilton's (1976) term). In my research design, the aim of the case study

was to gain specific insights into a problem, particularly in terms of existing concepts and theories, which is consistent with Stake's typology of "instrumental" case study.

The second important consideration was related to the type of setting which could serve as the "case" of knowledge exchange for the purpose of my study. Focusing on knowledge exchange organisations seemed to be the most straightforward way of finding a "bounded system", which, according to Stake (1994), is central to a case study design. There are multiple different types of organisations involved in knowledge exchange between research and policy; for example, think tanks (Rich, 2004; Smith, Kay, & Torres, 2013) or advisory bodies (Bijker et al., 2009; Owens & Rayner, 1999). However, as the focus of this study is on academic research and its institutional and cultural determinants, I decided to concentrate on the very "academic" forms of knowledge exchange, located at universities and employing academics themselves. The alternative method would be to focus on academic fields or specific policy problems and then explore the process of knowledge exchange "forwards" from the academic field or "backwards" from policy. However, as discussed in the preceding section, one of the key aspects of the research orientation assumed in this thesis was a focus on practices and meanings attached to practices. Both of the organisations I studied were established on the basis that knowledge exchange would be a core activity, rather than an ad hoc dimension of individual academics' work. This means the academics involved have gained substantial and diverse experiences of policy-science interactions. Focusing on an organisation, rather than on a specific policy area, allowed exploration of a multiplicity of practices related to both knowledge production and knowledge dissemination across different projects, with different levels of controversy, and involving different actors (e.g. policymakers, practitioners, civic societies).

Focusing on case study organisations allowed me to compare and contrast different areas, in terms of both policy fields and academic disciplines, which could help highlight which elements of the process of knowledge exchange were inherent to the academic-policy interaction in this context, rather than just the particularities of projects and policy areas. Finally, these organisations operated over an extended period of time, and were at the forefront of the institutional change aimed at promoting and legitimising impact and knowledge exchange work. Therefore, focusing on these

organisations provided a longer, historical overview of the institutional change, along with a focus on the challenges faced by the academics and how they have evolved over time.

4.3.2. Comparison

For the case study selection, I chose to compare two case studies. There were two main reasons behind this choice. Firstly, studying two different settings would allow me to gain a more in-depth understanding of the process of knowledge exchange and the factors influencing it on different policymaking levels (for example local policy, national policy, international policy), in different policy areas and at different universities. The exploration of these two cases was enabled by the contrast between them; hence the comparison was a central principle of this research design. This follows Bechhofer and Paterson's (2000) argument that all social science inquiry involves a comparison, just that it is not always explicit. These authors highlight the importance of making the comparison explicit, as implicit comparison might hinder the quality of social research.

Secondly, I assumed that knowledge exchange – like other academic practices (Becher, 1989) – would be influenced by the respective disciplinary cultures and their historically developed styles of reasoning. Therefore, I aimed to compare organisations with different disciplinary backgrounds to explore a diversity of meanings assigned to knowledge exchange as well as to go beyond seeing knowledge exchange solely in terms of a division between science and policy. After considering a few options (see: Section 4.3.3), I compared public health and sociology, as these two disciplines might be seen as polar opposites within social science. Sociology is often discussed as the closest to "basic research" of all social sciences due to its focus on producing (among other types) abstract and theoretical knowledge (Becher, 1989). Public health, on the other hand, is predominantly an applied field with a long tradition of policy and practice engagement. This distinction, which seemed to be important at the design stage of my PhD project, has indeed proved important, though the epistemological divisions turned out to be more complex and less neatly aligned with institutionalised disciplines than originally anticipated (which will be explored in detail in Chapter 7).

This choice – of exploring two case studies of knowledge exchange organisations – was not the only research design option and I considered alternatives before making the decision. One alternative would be to do one, more in-depth, case study or – quite the opposite – to include more case studies from various disciplines or abandon the case studies design and interview academics across disciplines. This dilemma was eloquently put forward by Gerring (2004, p. 348), who wrote: "Research designs invariably face a choice between knowing more about less and knowing less about more". In this study, I opted for knowing more about less. Focusing on a smaller number of bounded case studies allowed me to explore the diversity of meanings found in even one setting and to examine the process of knowledge exchange in depth. At the same time, I opted out of conducting a single case study, as I knew that comparison would not only be important for answering the research questions (as explained above), but would also be a better fit with my own cognitive and reasoning style. This is not to say that every study needs a comparison or that single case studies are always inferior; however, the choices discussed in this section were optimal both from the standpoint of my research problem and from that of my own skills.

4.3.3. Case selection

The case selection for this project was a challenging task for multiple reasons. Firstly, the meaning of what constitutes knowledge exchange, as seen by the research councils, was evolving throughout the years and the boundary between public engagement, knowledge exchange and research impact was not always clear. In the early 2000s, for instance, media relations and seminars were considered the main mechanisms for producing the social and political benefits of science (ESRC, 2002, 2003). By the late 2000s and early 2010s this would be considered merely a form of dissemination (RCUK, 2017), rather than an impact-oriented activity. Therefore, even identifying what a "knowledge exchange" organisation was proved challenging. Secondly, there are not many organisations of this type and there is no single repository of the organisations.

These choices were at the heart of my Master by Research project, conducted directly prior to the start of the PhD programme (Bandola-Gill, 2015). The MRes project was initially linked to an exploration of the Genomics Forum and was advertised by one of my supervisors, Prof Catherine Lyall. The initial idea for the partially-funded project

(for which I applied, although I was later able to secure a fully funded Principal's Career Development Scholarship from the University of Edinburgh) was to explore the Genomics Forum's model of knowledge exchange. During the Master's programme, I was able to take this initial idea and turn it into a comparative case study of multiple organisations. For the MRes project I decided to explore other possible organisations which could potentially serve as case studies for the larger PhD project. During this exploratory stage I initially planned to use the official ESRC lists or databases of funded organisations. With help from my supervisor, I contacted one of the ESRC representatives responsible for knowledge exchange to request such a list. However, these organisational records proved to be very limited and not comprehensive enough to enable a decision to be made. Accordingly, I identified potential cases based on the information I could gather from websites and from some scoping interviews. I took the opportunity to explore these different organisations in my MRes, which focused on four organisations: the Genomics Forum, Fuse, What Works Scotland[24], and Iriss[25]. As part of the Master's project I interviewed four representatives from these organisations and analysed organisations' websites. Undertaking this initial research was crucial for choosing the two cases, and the decisions discussed below were informed by this study.

After the considerations discussed above, I decided to focus on two organisations: the Genomics Forum and Fuse (whose profiles are presented in Chapter 1 Section 1.4.). The decision to use the Genomics Forum was straightforward, as the organisation fit the profile, was one of the trailblazers of knowledge exchange, and – more pragmatically – was one to which I had access (see: Section 4.4.). With more organisations of this type to choose from, and considering the findings from the pilot MRes study, I decided to approach Fuse, since this organisation had been operating for some time (as opposed to What Works Scotland which, at the time of making my research design decision in 2015, was only in the second year of operation). Furthermore, Fuse has an explicit focus on translational research, which made it a rich case study presenting a multiplicity of different policy-facing practices. Finally, one of the key findings indicated by the pilot study was the tension between doing

[24] See: http://whatworksscotland.ac.uk/ [accessed 28.08.2017]
[25] See: https://www.iriss.org.uk/ [accessed 28.08.2017]

academic and knowledge exchange work, a finding which seemed central to addressing the research puzzle and one which could be explored in depth within the university-based organisations (therefore excluding Iriss).

One of the important challenges regarding the research design was to compare a historical case of an organisation whose funding ceased before my research (in 2013, fieldwork being conducted in 2016-2017) with a currently operating organisation whose funding will run until 2018. During my fieldwork and analysis stages I remained cautious, considering how the differences in timings might impact on people's recollection of their practices and the interaction of these with policy and practice. Even though it was a challenging task, I did not feel that this difference in timings was greatly significant. One major difference I identified was in the levels at which the framings of the organisations were reflected in the interviewees' statements. Academics working in the Genomics Forum had a much more coherent recollection of their organisation, possibly resulting from opportunities for reflection during the writing of a final report and evaluation conducted by the ESRC in 2014. Fuse members presented less coherent and more diverse views on their organisation, therefore requiring more in-depth exploration in the analysis stage.

4.4. ACCESS TO ORGANISATIONS

The previous sections have described the research design of the study, including the approach to data collection and the analytical standpoint of a comparative case study. One issue I was conscious of from the beginning of the project was that the study design was highly dependent on (and vulnerable to) organisations' agreement to participate in the research. Accordingly, I sought administrative consent from the management of both organisations, who acted as gatekeepers of access to the organisations. In this section I will discuss the process of accessing the organisations and gaining administrative consent to their participation in my PhD research. More broadly, I will reflect on establishing rapport and gaining participants' trust as an element of the research process.

Ultimately, I was able to gain access to both organisations as planned. Unsurprisingly in light of the existing literature (Clark, 2011; Wanat, 2008), my already existing personal relationships proved the most helpful factor in gaining access to the

organisations. At the same time, accessing the respective organisations differed quite extensively in terms of the approach and formality of the process. Accessing the Genomics Forum was quite straightforward for many reasons. Firstly, my application for the Masters' project (Bandola-Gill, 2015) was linked to an advertised project to study the Genomics Forum. Secondly, its former director and two deputy directors are employed at my department and were aware of my MRes project before it was advertised. Therefore, my access to the organisation was achieved almost by default and was largely informal.

Such closeness to the organisation – including the fact that one of my supervisors acted as a deputy director in the final stages of the Genomics Forum – was not unproblematic. Undeniably, it made access to the organisation and some interviewees less challenging. However, there were some risks: the most important one relating to the openness of my interviewees, as well as the risk of self-censorship of my own expressions of critical analysis applied to the Genomics Forum. However – and here again the pilot study proved to be helpful – perhaps owing partially to the fact the Genomics Forum had officially closed before my research began, it did not appear to be an issue, as interviewees seemed open and often shared the problems they had while working in the Genomics Forum, as well as broader critiques of the incentive system in academia. Furthermore, being supervised by an academic previously associated with the Genomics Forum helped to mitigate some of the issues surrounding comparison of a historical case with a contemporary one. My supervisor could point me to relevant documents and events or quickly fact-check some of the issues relating to the historical case study that might otherwise have proved very difficult to assess.

Accessing Fuse was more complex. Again, personal links were helpful and in this case my other supervisor helped me to establish a connection with one of the deputy directors, who then introduced me to the director of Fuse. After a brief conversation the director proposed that I present my research proposal along with an invitation to participate in my study during a Research Strategy Group in June 2016. During that meeting the members of Fuse seemed relatively enthusiastic about my research, although during the discussion one person raised the point that the group has a responsibility to ensure protection of its organisational image. At the other end of the spectrum, a range of views were expressed that highlighted the position of Fuse as a

knowledge exchange organisation which inherently should be open to such research and transparent about their approach to knowledge exchange.

The issue concerning some of the meeting's participants had to do with the anonymity of the organisation, rather than with participating in the research at all. And this issue was indeed challenging. Despite good reasons to anonymise the organisations named (Ritchie et al., 2013), I decided to keep their names known, largely due to the doubtful feasibility of assuring anonymity in this setting. Knowledge exchange organisations were not that common, particularly in the early 2000s; therefore, in order to protect organisations' anonymity, I would have to anonymise their area of expertise, their geographical location and even their date of establishment (particularly in the case of the Genomics Forum, which was one of the first centres of this kind). And even with these precautions, there was a possibility that the organisations could be identified by people acquainted with this setting.

However, despite these arguments, the senior members of Fuse attending the meeting in June 2016 were not unanimous in their position on anonymity and a few options were discussed (full anonymity, full transparency or some hybrid form of consent). The issues raised by the meeting's participants had to do with a possibility/risk that my research might contain harsh scrutiny of Fuse: as one participant described it, there was a risk of reaching the conclusion that "Fuse is a waste of public funds", with the organisation having no way to respond to it. During the meeting I reassured the participants that my research was not an evaluation but rather a broad exploration of the knowledge exchange process and of the relationship between science and policy. Finally, Fuse's senior management gave me preliminary permission to access their organisation, one possible method that gained support being a tentative agreement to name the organisation, with an option to withdraw this consent and settle on full anonymity. The meeting's participants also asked me to prepare a study protocol (see: Appendix 3) that could be shared with the study participants.

However, after consulting my supervisors, I continued this process of negotiation, as this consent format seemed to pose a risk to my study (since the terms of withdrawal of anonymity were vague). Over the summer of 2016, I exchanged multiple emails with Fuse and we reached a form of agreement which entailed 1.) transparency regarding the organisation's name; 2.) an opportunity to review parts of my manuscript

once it was ready, within a 4-week deadline, to allow for factual checks and to check the protection of the anonymity of Fuse's members; and 3.) a presentation of emerging themes in the middle of the project and at the end of my research. This agreement was finalised at the beginning of September 2016, at which time the centre's administrator asked for my consent form and the study protocol in order to disseminate it to the centre's management. These two documents were accepted with only one minor change. One of the deputy directors suggested that I should add a sentence to the consent form explicitly stating that my research was not an evaluation. This suggestion proved quite useful for my research, as it seemed to put some of the interviewees at ease and also clarified the kind of information I was seeking. This was particularly the case for the interviewees working extensively with evaluations.

My experiences with gaining access to Fuse as a potential research site could be problematised in terms of issues with informed consent (or lack thereof) in qualitative, interpretive research. As my project was very iterative and open-ended, the members of the organisation could not give fully informed consent, for neither they nor I knew the exact direction my research would take. The issues of informed consent have been explored by scholars challenging the notion that consent could ever be fully informed (for example: Miller & Bell, 2014). In parallel with these discussions, the process of accessing Fuse (and to a lesser degree the Genomics Forum, as the administrative consent was granted via the MRes dissertation) could provide an illustration of a problem with what Miller (2017) describes as "unknowable-in-advance" aspects of qualitative research. My project was iteratively developing throughout the data collection stage, the focus was changing, research questions were being adapted, and the conceptual framework was evolving. Consequently, I could not assure Fuse representatives at this initial stage in the summer of 2016 of what the outcome of the project would be. I did, however, assure them that my project was not a post-positivist exploration of "what works" in the research-policy relationship, but rather a broader interpretivist approach to exploring the meanings and practices of actors involved in this process (therefore, not focusing on the assessment of knowledge exchange strategies and not linked to any value statements such as degree of success or failure).

This lack of certainty inherent in qualitative research is often seen to be mitigated by "doing rapport" (e.g. Kvale, 1996). Despite a multiplicity of studies discussing it as an

effective technique for securing access to the field (e.g. Petkov & Kaoullas, 2016; Reeves, 2010), rapport is often criticised as an ingenuous and instrumental approach to emotional aspects of doing research. For example, Duncombe and Jessop (2011) discussed this issue in detail, comparing "doing rapport" to "faking friendships". The issue of establishing rapport in order to access the field is ethically challenging for multiple reasons, including blurring of the boundaries of "informed" consent – as the consent would be given based on perceived friendliness or even friendship with a researcher (Duncombe & Jessop, 2011). This issue was particularly salient in the case of the couple of interviewees still working in the STIS subject group. Here, I was conscious of the need to avoid pressuring my interviewees to participate, so that they would not make a decision based on their relationship with me (as the student) or the department. Additionally, the focus on "rapport" can create pressure to do "emotion work" (Bergman Blix & Wettergren, 2015) perhaps particularly by women researchers who are seen as "naturally" predisposed to empathy and consideration of others' feelings (Duncombe & Jessop, 2011; Hey, 2001).

I, too, was affected by the emotional labour during the stage of gaining access to the field (akin to: Bergman Blix & Wettergren, 2015). On the one hand I wanted to seem approachable, trustworthy and "likeable" by Fuse's representatives. On the other hand, I did not want to make statements that could limit my ability to be critical of the academic institutions and discourses of which academics engaged in knowledge exchange are agents (Horsley et al., 2017). Throughout this stage I worried that I would not establish sufficient "rapport" with the organisation, and the uncertainly and caution of this initial stage would translate to selectivity in access to documents and interviewees.

However, despite these initial concerns, the continuing relationship with Fuse was relatively straightforward. Throughout my fieldwork this collaboration was very open and I was able to gain access to all the documents I requested. Furthermore, different members of Fuse were helpful with "snowballing" access to interviewees from areas of both policy and practice. During the presentation at the later stages of my fieldwork (given in March 2017), the Research Strategy Group received my material openly and the questions and suggestions were strictly about helping me to navigate the remaining part of the fieldwork. At one point, one of the members even told me that I should

present more negative views on the organisations, and discussed possible interviewees who, it seemed, would be good at capturing dissenting or dissatisfied views. Similarly, during the final presentation in July 2018 (open to all Fuse associates), the Fuse members seemed to be interested in my findings, one member of the audience even acknowledging that it was like "seeing a mirror". A number of audience members were very critical of the institutional incentive systems I was discussing and acknowledged a difficulty in working under contradictory institutional logics.

A more complicated process involved the check of the final transcript and a draft paper based on Chapter 5 (exploring academic practices). Here, Fuse's representatives sent a series of suggestions relating both to the fact-checking but also to broader conceptual points in the analysis, going beyond the initial agreement. Some of the points (as well as the scope of their comments as agreed before the fieldwork) were clarified during a meeting before the final presentation. At the same time, Fuse members made it clear that these comments were mere suggestions and that they did not expect me to make any changes. After reflecting on the comments and sending a short summary of the changes I made in the final transcript (mostly involving a few factual changes and clarification of selected arguments), the issue review was finalised and the overall experience was positive and informative.

One significant issue that characterised the process of accessing Fuse as an organisation and navigating the review of the findings was the very smooth and relatively immediate transition between a seemingly distrustful relationship and a trusting one. This paradox of trust goes beyond simple "rapport", even though some authors discuss these two concepts interchangeably or at least in close connection (which is criticised by more critical and feminist scholars, see: Phillip & Bell, 2017; Duncombe & Jessop, 2011).

This paradox of a seemingly smooth transition from distrust to trust between researcher and gatekeepers in qualitative research might be further explored by looking at it from the perspective of literature on the sociology of scientific knowledge. This strand of literature has long been concerned with issues of trusting or – on the other hand – challenging academic knowledge and the modes in which it was produced. The authors coming from this tradition (Bloor, 1983; Shapin, 1994) have argued that trust and distrust in science (or "scepticism") are not two separate phenomena or processes, but

rather are mutually constitutive (Ramírez-i-Ollé, 2016). Trust and distrust are closely related and, more importantly, distrust is never complete or absolute. As discussed by Shapin (1994, p. 9): "distrust is what arises at the edges of trusting systems". Even when there is distrust towards one of the elements of the knowledge production system, the overall framework of research is based on trust.

Seen from this perspective, the contrast between relatively unproblematic access to the field in the case of the Genomics Forum, and the more challenging process in the case of Fuse, does not necessarily mean that the latter was not based on trust and aimed at limiting the access to the organisation. In fact, it might just suggest different enactments of the relationships between trust and distrust in qualitative research; hence, Fuse's reaction was perhaps more of a test of the boundaries of trust than an expression of distrust. For example, by establishing the procedure for accessing the field (preparing a research protocol, arranging two feedback sessions and providing access to a draft thesis), the ambiguity surrounding the outcome of qualitative research has been mediated by reinforcement of the framework of trust. Arguably, the issues surrounding consent in qualitative research pose a challenge to the balance between trust and scepticism, so that accessing the field – or "building rapport" – might be seen as a trust-testing device, aimed at exploring the stability of the relationship between researchers and gatekeepers/interviewees, rather than a barrier to accessing the field.

4.5. INTERVIEWS

The choice of doing interviews as a main data collection method was rather straightforward. Considering the interpretive underpinnings of the project and exploratory nature of the research questions, I opted for an in-depth, qualitative inquiry. The common recommendation in pursuing these types of questions is to study them either through ethnographic observation or in-depth interviews (Ritchie et al., 2013). Since I wanted to focus on actors' understandings of their work and exploration of how the practices and their legitimacy changed in the course of time, I decided to opt for interviews. Additionally, as one of the cases was historical, ethnographic observation would have called for an exploration of the practices in their natural setting at the specific time or "window of observation" (Gomm, 2008, p. 273), whereas the goals of the study required capturing people's perceptions about the ways in which their experiences and practices changed over time.

4.5.1. Overview of the process

Access

Since my research questions were related to both the understanding of academics' work and their interactions with policymakers and practitioners, I decided to interview two main categories of actors – academics and research users (policymakers, practitioners, and representatives of other policy-facing organisations, such as NGOs, consultants, etc.). The first step of the interviewing process was to create a list of potential interviewees. I created preliminary versions of two lists – one for Fuse and one for the Genomics Forum, based on the organisations' websites and available documents. These online searches were then expanded by discussions with the gatekeepers of both organisations. Identifying potential interviewees among research users proved to be a more challenging task, as these actors were more dispersed across multiple different organisations. Here, I relied more heavily on gatekeepers and a "snowballing" process. Recruiting interviewees among the research users was particularly difficult in the case of the Genomics Forum considering the organisation's approach, which relied heavily on seminars and workshops where the interaction between the organisation and research users might have been a one-off, taking place a few years earlier. A few of the potential research users I contacted did not remember interacting with the Genomics Forum.

The rationale in choosing specific interviewees from a broader pool of people involved in Fuse and the Genomics Forum was that of "theoretical sampling" (Corbin & Strauss, 1990), whereby groups and subgroups of interviewees emerged as significant in the course of data collection and analysis – based on either "natural" differences between the groups (for example, senior vs junior academics, research intensive vs post 1992 universities, research users vs research producers), or other characteristics emerging as central in the course of research (more theoretically-oriented vs KE-oriented people). The overview of the interviewees is presented in Table 5.

Table 5. An overview of interviewees across different categories.

Category of interviewees	The Genomics Forum	Fuse
RESEARCHERS		
Senior academics	8	9
Early and Mid-career academics	7	12
RESEARCH USERS		
Policymakers	4	5
Practitioners	0	4
Others (e.g. NGOs)	1	1
Total	20	31
TOTAL		**51**

I relied heavily on gatekeepers in both organisations (usually the senior management as described in Section 4.4) to identify potential interviewees. This method offered many benefits (akin to those discussed in the literature: Clark, 2011; Sixsmith, Boneham, & Goldring, 2003): it assured a good response rate, and it allowed me to identify people who had enough, and sufficiently diverse, experience with the organisations and also were willing to share and discuss their experiences. The obvious shortcoming of relying so heavily on gatekeepers was the possibility of missing out on people dissatisfied with collaboration with both organisations or those who were located at the periphery of the organisations and were not as well connected. I shared this concern with the gatekeepers who were very open and willing to help me find potential interviewees. However, it was difficult, considering the nature of the organisations, which could simply be abandoned by any dissatisfied users (as they could simply stop coming to the seminars or participate in other events or tools offered by the two organisations). At the same time, once I started the interview process, I quickly discovered that the interviewees were open about both the advantages and disadvantages of working with knowledge exchange organisations, which eased my concerns about a one-sided sampling.

Anonymity and consent

Prior to a conversation, the interviewees signed a consent form discussing the goals of the study, the right to withdraw from it, data management strategy, and anonymity (see: Appendix 1). As discussed in the previous section, I opted for naming both organisations, which would inevitably lead to problems with anonymisation of interviewees within organisations, since they could potentially be identified based on their organisational affiliations. Even with very limited quote identifiers (excluding names, gender, positions, projects or institutional affiliations), there was still a risk that the interviewees would be recognised, considering the limited pool of people employed by both organisations. I ensured that this was made clear in the consent form and in many cases I pointed it out to the interviewees before the interview. But even with these precautions, securing the anonymity of the members of these two groups, particularly those as closely networked as academics, was challenging.

Considering the aforementioned factors that were already weakening the assertions of anonymity, I intended to make sure that I kept the list of interviewees anonymous. It was a difficult task, as the interviewees, in an effort to be helpful by suggesting other potential interviewees, or just in the course of small talk before the interview, commonly asked me whether I had spoken to their colleagues. This led to many awkward moments when I had to tell them "I cannot confirm or deny this", which inevitably reinforced the sense of formality and unequal relationship between researcher and participant. In addition, multiple interviewees willingly waived confidentiality on their own by telling their colleagues about an interview (which seems to have been the case for other researchers interviewing academics; for example, Smith, 2008). In one case an interviewee enthusiastically described the interview experience in a chain email to half a dozen people. Therefore, many of the interviewees seemed to have a lower expectation of anonymity than that indicated in my research design.

4.5.2. The interviewing experience

The interviews took place in two rounds – April-August 2016 (the Genomics Forum) and November 2016-April 2017 (Fuse). The vast majority of the interviews took place face-to-face, in a private room. Six interviews were carried out by phone/Skype per interviewees' requests or due to geographical location. All of the interviews were

digitally-recorded. The recorder was usually placed on the table to visually remind the interviewees of the recording.

The interview schedule consisted of a set of broad questions that I was aiming to cover, extended by a few supporting questions to be used in cases of less talkative interviewees (see: Appendix 2). Initially I began my interviews by asking questions about the perceptions of the organisations and their goals; however, after a few interviews I changed the order of questions to ask about the interviewee's experiences with the organisation. All the remaining interviews began with a question regarding the interviewee's position in and relationship to the organisation (for example, what the role entailed if it was a role in a knowledge exchange organisation, as well as the way different actors interacted with the organisation). This set of questions had two purposes: firstly, it gave me an opportunity to gain knowledge about the organisational structures which would not be available through the websites; secondly, I soon noticed that it was an easy way of "warming up" the interviewee. I realised that, for many people, organisations are to a large degree abstract concepts, merely providing frames to interviewees' everyday experiences. Therefore, questions about organisations were quite abstract (particularly considering the second, equally abstract dimension – knowledge exchange) and seemed difficult for some interviewees, particularly those who were not used to qualitative interviewing.

The interviews were semi-structured and loosely followed a script prepared beforehand. Initially, conducting interviews was quite stressful for me, as I worried about time-management, asking all the questions I had prepared as well as follow-up questions, focusing on the answers and trying to maintain eye-contact. Therefore, initially, I would ask mainly the scripted questions. However, after a few interviews I gained a measure of confidence and could truly conduct a *semi*-structured interview, asking follow-up questions, changing the order of questions and exploring new themes. In that sense, every set of questions was different but each followed the same main themes.

The disciplinary differences between the interviewees became apparent from the start of my fieldwork – not only in the way they understood and practised knowledge exchange (explored in Chapters 5-7), but also in how they interacted with the interview process. It was particularly evident in the relationship to the research process shown

by the STS researchers. A few of my STS interviewees made humorous comments about my consent form and signed it without reading. Another example of STS research breaking the convention was found in interviewees' questions about the content of their responses. For example: is this what you wanted from this question? These examples of methodological "breaking the fourth wall"[26] might have signalled detachment on the part of my interviewees in this setting. Academics researching the socially constructed nature of institutionalised knowledge production understandably might have leaned towards a somewhat distanced position in relation to the process of research, even causing them to present a "role distance" (Goffman, 1956) to signal that they realised the artificiality of the process. The public health interviewees, on the other hand, did not signal any of these attitudes and in general approached the research process formalities (consent forms, research outline) with greater attention.

4.6. DOCUMENT ANALYSIS

The second source of data was the documents. My analysis was informed by two broad categories of documents aimed at different sets of objectives (and related research questions): firstly, those relating to the science policy background of knowledge exchange, particularly in terms of social and economic benefits of science and impact; and secondly, those concerning the two case study organisations, such as their application documents, reports and websites (particularly descriptions of the organisations themselves and previous projects, events, etc). In the initial stages of my project I intended to only focus on the latter, as I envisioned my project to be mostly about the process of knowledge exchange. However, after a few initial interviews conducted for the MRes project, I realised that understanding the science policy context would also be central to understanding academic practices and changes over time. Overall, I analysed over 80 documents. The list of the analysed documents is presented in Appendix 4.

The first group of documents entailed 58 documents concerning research funding (including research priorities, strategies and spending) produced by the government

[26] Therefore, akin to the situation in theatrical performances where an actor breaks the convention – an imaginary fourth wall between the scene and the audience – and addresses the audience directly.

and research councils. This analysis was aimed at providing background necessary for answering the main research question discussed in Chapter 1 Section 1.2:

How do academics reconcile the expectations of objectivity and relevance within interactions with non-academics?

As such, the analysis of this group of documents was targeted at exploring the way "expectations" central to this research question were shaped by the institutional level changes in academia changing the core incentives. I collected the policy documents by researching the websites of government departments and funding bodies (HEFCE, ESRC, MRC, RCUK) as well as literature discussing the development of the impact policy (Davies et al., 2005; Martin, 2011; Meagher et al., 2008; Payne-Gifford, 2014). The set of documents was also selected based on the temporal dimension, starting date set for 1993 (publication of Realising Our Potential as the document initiating the impact agenda) and 2016. However, one document (regarding the initial decision on REF 2021) has been added during the final stages of writing-up to assure a comprehensive analysis.

I approached the documents as reflections of particular framings and narratives around impact, rather than just as descriptions of the reality (Bryman, 2004b). The relationship between the policy documents and the academics' perspectives gathered via interviews was complex, and it soon became clear that the knowledge exchange organisations could not be seen merely as examples of implementation of the "impact policy". At the same time, the discrepancies between the findings stemming from the analysis of strategic science policy documents and the findings emerging from the interview data were of key importance to the overall analysis, as they clearly indicated diverse paradigms driving knowledge exchange (data analysis approach is discussed in the following section). Therefore, the comparison between different sources of data was central to the analysis process (summarised in the following section).

The analysis of the second group of 27 case study documents (although some of the information pertaining the two cases was discussed in ESRC and MRC reports categorised in the first group) helped me to clarify and identify the sources of tension in knowledge exchange work (and became the basis for Chapters 5-7). Often the practice of combining different methods is discussed in terms of "triangulation" of

methods in order to increase the validity of data (for example through using documents to confirm information from interviews) (Bryman, 2004a; Moran-Ellis, 2006). This was the case to a degree in my research, particularly where more historical accounts were involved, when the interviews could highlight why actors were doing different things and documents could then augment the actors' depictions by adding more historical details. However, combining documents and interviews was more useful – and aligned with the interpretative paradigm - when explored in terms of triangulating the viewpoints or "intertextuality" (Schwartz-Shea, 2015) – thus expanding the analysis by presenting it from different perspectives. The analysis of documents helped me to contextualise the findings stemming from the analysis of interviews, not (or at least not only) by confirming the information, but rather by fleshing out the contrast between different accounts of the social reality (for example between the views of funders and of academics). Thus, understanding the tension between doing research and doing impact work became clearer and more contextualised once it was contrasted with government narratives of 'excellence leading to impact'.

4.7. DATA ANALYSIS

The process of data analysis was intertwined with fieldwork, rather than taking place at a specific stage afterwards (akin to the ideas behind theoretical sampling in grounded theory – see: Draucker, Martsolf, Ross, & Rusk, 2007). From the early sets of interviews, it became clear that the two case studies, the Genomics Forum and Fuse, had developed different approaches to knowledge exchange, as well as different understandings of the "impact" they wished to achieve. The process of data analysis was then focused on systematically exploring these differences in meanings across the two organisations and contrasting them with meanings embedded in the policy documents.

My approach to data analysis was inspired by grounded theory, an approach in which abstract concepts are derived from empirical data through an inductive analytical process of constant comparison between different sources of data, emergent categories and concepts (Charmaz, 2006; Mills, Bonner, & Francis, 2006). Grounded theory is often cited as an analysis method; however, it has been largely "black-boxed" in terms of what is actually being done when people claim to be using "grounded theory". Grounded theory is also a broad umbrella term for different forms of analysis. I

initially aimed to follow the classic grounded theory coding frameworks (Charmaz, 2006; Strauss & Corbin, 1998) of line-by-line (descriptive) coding, followed by focused coding and theoretical coding. However, I soon realised that line-by-line coding, while being very time-consuming, was not providing me with any additional insight. This type of coding supposedly makes it possible to see the data with a "fresh set of eyes" by creating distance from the data (Charmaz, 2006). But I quickly found that it was not necessary to create codes for every line in order to achieve descriptive codes that could serve as a basis for further description. Therefore, I decided to adapt my unit of coding and I opted to code each paragraph but also to explore all possible codes that could be assigned to a given paragraph (therefore analysing each line without necessarily adding a code to each line). I found this strategy to be both efficient and quite insightful. Using longer units of coding allowed me to quickly notice codes that co-occur with each other (which I coded as relationship nodes in NVivo), providing me with a basis for further analysis in the subsequent stages of analysis. During this stage I was creating analytical memos reflecting on the process and emerging codes.

The stages of focused and theoretical coding were rather intertwined and I approached the two as a useful heuristic rather than as a strict set of guidelines. In some cases, the separation between focused and theoretical coding was indeed present. For example, the analytical journey to the finding regarding institutional logics basically followed the descriptive-focused-theoretical coding framework. I initially just described the interviewees' experiences and meanings (for example regarding publishing, interacting with policymakers, and perceived role of science and academics in the process) and ones expressed in documents (for example regarding basic research, excellence, relevance, collaborations). Then in the second round of coding ("focused coding") I explored which of these codes occurred together (and coded these as "relationship nodes" in NVivo). This allowed me to create sets of codes that co-occurred together (which I initially labelled "academic" and "broker"). At this stage of my analysis I used some of the NVivo query options (in particular the matrix query) to explore how these two sets of codes were placed across the two organisations. This, indeed, confirmed my initial perception, expressed in my fieldwork notes, that the two organisations differed in their perceptions of science and its role in policymaking.

Interestingly, the few accounts of some actors which did not fit within the main "organisational" account of knowledge exchange were closely aligned with the perception of the other organisation. In other words, there were some cases of people whose perception of knowledge exchange was not aligned either with their own organisation or with some third alternative, but whose understandings, instead, could be placed in the second organisation. This exploration suggested that there are bigger, institutional forces shaping the process. In turn, this puzzle was explored in the theoretical coding phase, where I examined and integrated some of the organisation studies theories and decided that institutional logics (see: Chapter 2 Section 2.3.) explained my findings most closely.

However, more often my coding was less linear, "focused" and "theoretical" stages coding were much more intertwined, and the boundaries between the two were more blurry. This was particularly the case for the concepts and literature that I was more familiar with. For example, the findings on different meanings assigned to "research impact" and the practices linked to them (discussed in more detail in Chapters 5 and 6) provided illustrations of such blurred coding where I operated with pre-existing concepts (such as advocacy, policy learning or conceptual and instrumental impacts) much more quickly. Overall, I found the process of coding to be very similar to what Tesch (1990) expressed as decontextualising data (from particularities of the setting) and then recontextualising them in the broader conceptual and theoretical discussion.

Overall I found NVivo to be a helpful tool in my analysis. I was wary of some of the potential problems in using qualitative data analysis software (such as segmentation of data, see: Ritchie et al., 2013). One of the issues was focusing too much on "codes" – specific parts of the transcripts, rather than overall narrative running through the interview. I made sure that I came back to the original text of the interview as well as to "participant memos" – files I created for each interviewee, containing an overall summary of the interview and the main points made by the interviewee.

The final coding structure consisted of a few broader themes, including Practices and Strategies for Knowledge Exchange, Meanings of Knowledge Exchange, Boundary Work and Politics. These themes formed the initial basis for structuring my thesis. I found that the writing-up process was indeed the last stage of analysis, since on being written down the concepts became clearer, relationships more meaningful and

conclusions sharper. Some of the themes (for example Academic Culture or Practices) ran through more than one chapter. Different meanings, narratives and phenomena are closely connected and influence each other. For example, issues concerning academic culture were closely connected with practices anchored in these cultural understandings (see: Swidler, 2001). Therefore, the distinction between different themes and concepts was more of an analytical act than one of direct translation from interviews. However, even though I needed to make such analytical calls (which in some ways limited the complex reality I was exploring), I tried to stay as close as possible to the interviewees' accounts and the distinctions they were making.

4.8. LIMITATIONS

The previous sections explored the research design and data collection and analysis strategy employed in this PhD project. Before turning to empirical findings, this section will discuss the shortcomings of this work. Research design is a choice that sets the project on a specific path. And even though, as I highlighted throughout this chapter, the design decisions were made by extensive exploration of literature discussing good research practice, methodological reflection, and gained familiarity with the field, that does not mean that the path set up by these choices was the only one, or indeed was a path without limitations. In this section, I will reflect on the choices that I made and the alternative paths that could have been chosen.

The first limitation lies in the central element of the research design of this study – namely the focus on two case studies. Arguably, such a situated study would be problematic in terms of generalisability of these findings to the broader population of knowledge exchange organisations. Nevertheless, the goal of this study was not to produce generalisable outcomes, but rather to gain theoretical insights and inductive exploration. Therefore, this study aimed to offer generalisability in terms of theory (Bennett, 2004; Stake, 1994), rather than generalisability to other settings. At the same time, broadening the research to include other disciplines (for example in humanities and natural sciences) and types of organisations (for example, think-tanks, "What Works" centres, advisory bodies) would very possibly be beneficial for exploring these theoretical themes in different contexts. Furthermore, as argued throughout this work, the institutional context of knowledge exchange and impact is changing – even in the course of Fuse and the Genomics Forum's lifespans, evolving norms and resources

affected multiple areas of their activity, such as the legitimacy of impact-oriented work or the acceptability of different framings of knowledge exchange (as the more utilitarian models came to be promoted in research funding). Therefore, a more longitudinal study might be beneficial in capturing this prolonged cultural and institutional change. One factor that indirectly informed this research and helped me to gain confidence in the validity of insights stemming from these two case studies was another research project conducted at the University of Edinburgh in collaboration with Prof Katherine Smith, which explored perceptions and experiences of impact by academics across disciplines. Even though in this thesis I did not directly draw on data collected in that study, I could reflect on the broader relevance of the findings from this research to other disciplines.

Science-policy interactions are multifaceted and dependent on multiple factors within a complex system (Best & Holmes, 2010; Greenhalgh et al., 2004). Arguably, this research did not study all possible factors which could explain knowledge exchange but rather focused on a particular snapshot of this process – one involving interactions between academics and policymakers, in dedicated spaces, with their institutional and encultured character. This analytical and methodological choice resulted in some groups of potential interviewees being excluded. For example, this research did not look into broader categories of research users, such as members of the general population, service users, etc. Neither did it look at higher management – for example within the universities or among research funders. From the project's methodological and analytical standpoint, it was justified in studying only academics and their direct research users. More importantly, this perspective enabled significant contributions explored in the following chapters, as it highlighted the academic side of knowledge exchange in detail. Nevertheless, understanding the wider audiences would help to understand the full picture of knowledge exchange.

Another limitation of the approach concerned the access to interviewees. Both organisations operated over a long period of time, with hundreds of different engagement initiatives (see: Chapter 1 Section 1.4.). And interviewees' recollection of the events varied. For example, some remembered vividly a workshop occurring almost 10 years prior (covering the topics of biofuels); others did not remember even important events. The most prominent example of the second situation was the project

conducted with the Human Genomics Commission in 2008: "Citizens' Inquiry into the forensic uses of DNA and the National DNA Database". I intended to interview the members of the working group, representing collaborating institutions (HGC, Sciencewise, PEARL Research centre, media). However, when I contacted them, no-one remembered working with the Genomics Forum. This limitation did not necessarily mean that the robustness of the data was compromised, as I was drawing on various resources (including documents and websites) and the HGC project was a one-off case. However, this experience might give an insight into the study of knowledge exchange, particularly in a multi-stakeholder collaboration – as it seems that even though the prolonged timelines of research impact are broadly discussed in the literature (Greenhalgh, 2004), its traceability seems to diminish with time. This insight could open up new avenues of research into the methodological approaches to researching knowledge exchange (for example, advisable timelines of research or data collection strategies).

Conceptually, this thesis aims to bridge multiple disciplinary approaches: to offer STS into evidence-based policy and knowledge exchange, as well as to apply insights from organisation studies to science policy considerations. In this sense, the project was inherently interdisciplinary. And it is perhaps the nature of interdisciplinary projects that they open-up multiple areas of consideration (arguably more than could be covered in one thesis). Some of these areas have not been explored in detail. From the science policy studies perspective, this thesis could have explored the broader trends in research funding, such as the emergence of performance-based funding (Hicks, 2012; Himanen et al., 2009; Whitley, 2007) and elaborate research evaluation systems (Hammarfelt & De Rijcke, 2015), as the emergence of research impact is undeniably a part of this trend in research funding and assessment. These were only marginally incorporated, as factors accentuating the duality of impact and excellence. From the STS perspective, the case studies could have been looked into from the perspective of democratisation of expertise (Lövbrand, Pielke, & Beck, 2011; Stirling, 2008; Wynne, 2007). This perspective of publics on the topic of knowledge exchange was largely omitted, due partly to the design of the study, which entailed looking at people directly involved with the organisations, rather than to the policy problems organisations with which the organisations engaged. These areas of inquiry are at the same time

limitations of this research but also opportunities for further research. I will continue discussing these future opportunities in the Conclusion chapter.

4.9. CONCLUSIONS

In this chapter I have presented an in-depth reflection on the methodology and practice of this research project. I have discussed the intepretivist background of this project and the assumptions about the nature of knowledge that could be produced in a qualitative research project. I then discussed how these assumptions shaped the choice of methods and approach to data generation. I have argued that an important element of conducting research on organisations is the balance to be struck between trust and scepticism, but that, as argued, these two are not mutually exclusive. Furthermore, I have presented my approach to data generation through interviews and document analysis, as well as the approach and practice of data analysis. Finally, I have discussed the limitations of this methodological and conceptual approach. In the following chapters I will present the empirical findings that emerged from these processes.

CHAPTER 5

BETWEEN EXCELLENCE AND RELEVANCE – KNOWLEDGE EXCHANGE AND ACADEMIC PRACTICES

5.1. INTRODUCTION

The starting point of this thesis was a recognition that the academic culture and institutions in the UK have been changing in the last decades. I have argued that the development of the so-called "impact agenda" has led to the introduction of a new institutional logic – a logic of impact which guides the behaviours, actions, understandings and even identities of UK academics. This logic has emerged to co-exist with the traditional academic logic of excellence. As a result, UK academia is progressively becoming a hybrid of the two logics, even though at times these two logics contradict and compete with each other. Such a pluralistic environment poses a number of challenges to legitimacy, governance and change within organisations (Kraatz & Block, 2008). These challenges are largely overlooked in science policy documents, discussed in Chapter 2, which portray the relationship between impact and excellence as seemingly unproblematic and even causal ("excellence leads to impact"). And unsurprisingly, this depiction can be seen as counterfactual once it is compared to the experiences of academics working on impact projects. This chapter will explore these contradictory sets of expectations and the ways in which the academics associated with Fuse and the Genomics Forum have approached them.

One concept that is particularly useful in explaining a change in institutions is that of practices. The focus on practices is central because practices link individual action with broader cultural beliefs and social structures (Bourdieu, 1977; Schatzki et al., 2001). By reproducing institutionalised practices, individuals enact institutional logics. Therefore, the practices are emblematic of the dominant institutional logics – and consequently, the changes in practices might be emblematic of wider changes in culture and institutions (Thornton et al., 2012). Schemas and ideas – such as

institutional logics – are always incomplete; they merely provide a conceptual blueprint which is turned into reality through practices (Swidler, 2001). The emergence of new practices is one of the key indicators of a new institutional logic as well as an area in which contradictions between logics are most evident (Berman, 2012b; Glynn & Lounsbury, 2005; Martin et al., 2017). The literature points to diverse ways in which actors deal with paradigmatic pluralism within institutions, for example by following different practices in different locations (Lounsbury, 2007), or compartmentalising practices, guided by different logics, across different roles within an organisation (Smets et al., 2015).

This chapter will examine this problem in the context of knowledge exchange. By exploring practices and associated tensions stemming from the dual-legitimacy of the organisations, it will study ways in which institutional logics are enacted in practice and academic culture is evolving. In order to do so, I will firstly examine different understandings of evidence and ways in which different discursive understandings of knowledge are institutionalised. Then I will discuss different categories of practices that can be identified, based on their relative closeness to these discursive framings of knowledge. Finally, I will examine two exemplars of practices – seminars and evaluations – in order to examine how these different sets of tensions have interacted in practice.

5.2. FROM RESEARCH TO EVIDENCE

The point of departure for considering the research and knowledge exchange practices of Fuse and the Genomics Forum is an acknowledgement that scientific knowledge does not enter policy in a linear or almost automatic way (Davies et al., 2008; Greenhalgh & Russell, 2009; Greenhalgh & Wieringa, 2011). Policy and practice are areas of proliferation of different types of knowledge and ways of knowing, and the understanding of knowledge and understanding of policy mutually construct each other, making the relationship a challenging object of study (Maybin, 2016; Radaelli, 1995). A particular challenge stems from the epistemic diversity and hybridity of policy knowledge (Jasanoff, 1990; Pearce & Raman, 2014; Wesselink, Colebatch, & Pearce, 2014). One illustration of this issue is found in the work on barriers to and facilitators of the uptake of research in policymaking, which has clearly indicated that

in fact, the factors that might make research "academic" (such as language, level of abstraction or complexity) might prevent it from being used by policymakers (Innvaer et al., 2002; Oliver et al., 2014).

This section will explore how academics working on policy impacts perceived differences in the understanding of evidence across different domains as well as varying approaches to the quality appraisal of knowledge. Somewhat expectedly, the vast majority of interviewees indeed pointed out that policymakers operate under disparate assumptions regarding evidence, the form it takes, its usability and quality. For example, summarised by one interviewee:

> I think we – both sides – really think what evidence means… We think differently about evidence that, when you're trained in science, you get a sense of priority of evidence. (Fuse 7)

Reflection on the epistemological qualities of different forms of knowledge and evidence is crucial to understanding the different knowledge practices conducted by Fuse and the Genomics Forum. The perceived tensions between different, institutionally and culturally embedded forms of knowing shaped not only the organisations' practices but also the perceptions of the achieved results. Two of the tensions were particularly prevalent here: a tension between universality and locality of knowledge, and a tension between different approaches to understanding and assessing quality of research. I will discuss these two aspects in the following sections.

5.2.1 Generalisable and local knowledge

One of the key tensions – and one most often reported by the interviewed academics - was between the contextualised versus the universal character of knowledge. The quest for objectivity in scientific knowledge is one of the key tenets of academic activity (see: Chapter 3 Section 3.3.3). Going back to the classic Mertonian norm of "universalism", the notion that "objectivity precludes particularism" has been a cornerstone of academic knowledge production (Merton, 1942). The ideals of objectivity have been shaped not only by the epistemic virtue of such knowledge, but also by the practicalities of knowledge production within academia throughout history (Daston & Galison, 2007). Academics communicate with the international community of scholars mainly through published work; therefore, the content of such

communication ought to be separated from contextual factors which might be difficult to convey. As noted by Daston in the discussion about quantification:

> For quantification, no matter how thorough and detailed, is necessarily a sieve: if it did not filter out local knowledge such as individual skill and experience, and local conditions such as this brand of instrument or that degree of humidity, it would lose its portability. The moral commitment to a certain form of sociability among colleagues who may never meet face to face must be strong in order to countenance the loss of so much hard-won detail. (Daston, 1995, pp. 9–10)

Therefore, in order to satisfy the quest for objectivity (and meet the standards set in the academic community), knowledge produced in academic institutions ought to be universally understandable and detached from the context. This set of values and practices is somewhat contradictory to the values that guide policy work, which is by definition deeply embedded in the particularities of the context (as illustrated in the review of regulatory science in Chapter 3 Section 3.3.2). And the two types of knowledge are often in competition with each other. As argued by Abbott (2001, p. 135): "The reality is that problem-based knowledge is insufficiently abstract to survive in competition with problem-portable knowledge." This juxtaposition was perceived as highly problematic for the academics working on policy projects. As highlighted by one of the Fuse associates:

> When you work with policymakers […] you learn the importance of the local, so what do you do if you have evidence-base where you have three outstanding randomised control trials, all conducted in Japan in the 1980s, and you have a recent quota to study with 29 constituents of the local community. It's very difficult to say – if they point in different directions – how you align that evidence with each other. There are many examples where we simply learn to look into evidence in a different way. (Fuse 7)

The rationale behind this contextualised policy knowledge lies in its hybridity: while making decisions, policymakers are taking into account a multiplicity of different factors, values, objectives, etc. (Freeman, 2007; Majone, 1989; Maybin, 2016). Therefore, the focus on particularities is key to making sense of multiple different claims, as the process of turning this "bricolage" (see Freeman, 2007) into specific, unitary policy decisions is necessarily situated in the context. This is in stark contrast to the practice of producing objective, often quantified knowledge. For example, as highlighted by a public health decision-maker:

> There's always a tension whenever you look at evaluation between the kind of purity of the question that from an academic perspective you want to ask, controlling for everything else, and the fact that on the other side, you have the - so to say - you're never going to see that issue in isolation. It will only ever exist as part of a complex situation, and therefore knowing the answer to the isolated part of that question is of limited value to us. In any case, it's going to take you two years and £800,000 to tell us one way or the other, and that's not really going to be that useful. There's always that strain. (Policymaker 1)

The tension between contextualised and universal knowledge was particularly visible in Fuse, as public health is one of the fields with historically developed hierarchies of evidence (Evans, 2003). These conceptualisations, as discussed in detail in Chapter 3 Section 3.2.1, place different values on evidence, depending on the method of research production. For example, they privilege randomised control trials (RCTs) or systematic reviews over expert opinions, testimonials or anecdotes[27].

As previously discussed, the hierarchies of evidence are unable to capture the epistemological complexity of policymaking (Booth, 2010; Cairney & Oliver, 2017; Petticrew & Roberts, 2003). The tension between these rigid definitions of evidence and the manifold needs of policymakers might be exemplified by the challenge to knowledge exchange practices posed by the public health reorganisation in 2013[28], when the responsibility for public health provision in England was reassigned from the NHS to local authorities. According to the Fuse academics' perceptions, the NHS has operated under a discursive framing of evidence similar to that of public health academics, drawing on the biomedical model of reliability of knowledge, with higher value assigned to RCTs and systematic reviews. Contrary to this model, local councillors did not operate under these assumptions, focusing on the locality of knowledge in preference to its objectivity. They wove personal stories and narrative-based arguments into the decision-making process, which proved challenging for the

[27] However, one of the senior academics recently acknowledged that the thinking around this evolved: "This was indeed the case but is no longer a fair comment. Things have moved on and there is now much more acceptance of a 'horses for courses' approach to evidence rather than a hierarchical approach of the type depicted here. Pluralism and diversity have for some time been a central feature of Fuse's approach to evidence generation, especially in the second 5 years of its life as demonstrated by its complex systems research programme."

[28] This change was introduced in Health and Social Care Act 2012, see: http://www.legislation.gov.uk/ukpga/2012/7/contents [accessed: 28.10.2018]

academics who struggled with "turning the evidence ladder upside down" (Fuse5). As discussed by one of the academics:

> For the elected members the evidence is something they collect from their constituency's experience. And they tell stories about what happened at their local constituency. And for them, that's evidence. And what academics contribute is not always seen to be as evidence, it's seen to be something a little bit more detached, a bit remote, they cannot connect with it. Whereas they understand the experience of their constituency and things that happened in their local area. So in that sense, they see knowledge as something different and wider than just traditional academic research. (Fuse 1)

However, moving away from the hierarchies of evidence heuristic was challenging to academics, for several reasons. One – mentioned earlier – is the institutionalisation of different framings of knowledge and evidence. Knowledge is organisationally bounded (Daviter, 2015; Dery, 1986; Wildavsky, 1983). Therefore, moving between different institutional settings required adapting the understanding of evidence (Lorenc et al., 2014) – and some organisations' framings are closer than others (for example NHS and academia vs local government and academia). Furthermore, different institutional framings of knowledge would require the academics to engage in different practices. For example:

> In a scientific sense, evidence is what… the fact that a trial has been done in London or Chicago means nothing to you if you live in Hartlepool. You want to know, would this work in Hartlepool. So more important to you as evidence is evidence of need in Hartlepool for this service. Evidence that they did it up the road in Chester-le-Street and it worked there. So why wouldn't it work in Sunderland or Hartlepool or whatever. And that's far more important to you than so called scientific evidence. So that's completely changed how you try and present what you know from research to local public health teams and how local public health teams react to that and work with that evidence with their policy partners and their political partners. (Fuse 11)

Some of the interviewees discussed the "politicisation" of decision-making post-reorganisation of public health in England as one of the barriers to effective knowledge exchange. Even though the responsibilities of the elected members would, in all possibility, require a higher level of political deliberation as compared to the NHS, this framing of politicisation of evidence was emblematic of the assumptions held by the academics regarding the valid forms of evidence and types of evidence producers. This is particularly important considering the fact that the framing of evidence-based

policymaking – with its rigour, objectivity and particular ordering of evidence – inherently contradicts the prioritisation of more subjective, experience-based narratives by the local councillors when deciding on what to consider. As discussed in Chapter 3 Section 3.2.1, once knowledge is ordered, some of its forms will be seen as more desirable than others. This might lead to a framing in which evidence and the public's experience could be seen as contradictory.

The consequences of the ordered thinking about knowledge were visible in the way some of Fuse's members constructed the public. By contrast with the Genomics Forum's members, only a few of Fuse's associates named the public as a target audience, and the few who did saw the public as a target that could be reached through policy and practice improvement, rather than as directly involved in evidence-informed policy and practice. Therefore, the framing of EBP could lead to privileging specific forms of knowledge (Newman, 2011) and consequently to privileging specific groups engaged in the process while excluding others

This issue was not as problematic for the members of the Genomics Forum. The social sciences were more immune to the practices of ordering of knowledge. An illustration of this epistemically open approach was the project conducted in collaboration with the Human Genetics Commission (HGC). The Genomics Forum managed to secure funding from the Wellcome Trust and The Department for Innovation, Universities and Skills (DIUS) and, in collaboration with HGC, conducted a Citizens' Inquiry into "civil rights, fairness and effectiveness issues around the national DNA forensic database" (The Genomics Forum, 2013, p. 17). The members of the Genomics Forum promoted an action-research approach, through which the patients' group had an impact on the shape of the report and final write-up. As illustrated by this case, the Genomics Forum's academics – predominantly qualitative social scientists did not think in terms of "evidence hierarchies" but rather employed a broader view of evidence as a representation of the voices of the experiences of various members of the public, for example patients or consumers.

5.2.2. Multiple enactments of excellence

The second key epistemic tension identified in interviews was related to differences in perceptions of the quality of research across different knowledge domains. Academic

science has developed a long tradition of institutionalised quality assurance which was seen as a guarantor of the production of "good science" (Jasanoff, 1990), for example, in the form of peer review or in the use of metrics such as the impact factor of journals or of citations as instruments of self-regulation (De Rijcke, Wouters, Rushforth, Franssen, & Hammarfelt, 2016; Hicks, 2012; Wilsdon et al., 2015). The quality of research in this context is therefore recognised by adherence to a set of institutionalised practices and mediated through the perceived quality of the outlet of such research.

The interviews with Fuse and the Genomics Forum associates have pointed to multiple problems with adapting the notion of academic excellence to the policy setting. There were two main dimensions across which quality criteria would differ between academia and policy: methodological rigour and scope of the research questions. The issue of different methodological standards might be illustrated by the following quote:

> Very specifically, research that's funded academically is done to a different standard. It has to go through an academic peer review [in the] best quality journal you can get to. Research for policy reasons does not have to be...might be, but it doesn't have to be ... done to that standard. It has to be really done to a standard that's just good enough to the purpose of the decision-making. It's a different ... it may not be as rigorous. […] It might use different techniques. It might be done in a different way. It wouldn't perhaps be classed necessarily as the same academic output quality, academic outcome. […] You could make a decision on a different level of evidence. (Fuse 8)

As characterised by the interviewee above, the decision-makers were not expecting the same level of adherence to methodological standards in their decision-making as the academic community. This is akin to McGill's (2015) findings arguing that the local policymakers privilege contextualised knowledge over academic rigour. Such a dichotomy presented the academics working with Fuse with a clear problem, as they have to navigate the robustness of evidence and its relevance.

Associates of the Genomics Forum encoutered this issue to a lesser degree but one way in which they did struggle with the assessment of quality of research was in cases of secondary research, which summarised and reviewed the state of the art in specific areas of genomics. These summaries were targeted at policymakers and even though they required research work, they would not be regarded as meeting the standards of academic inquiry.

The second way in which the concept of academic excellence does not travel well between the academic and policymaking settings is seen in the type of research questions perceived as valuable. For example, as illustrated by a policymaker working in the North-East setting:

> I think that there's a perception in a research assessment context, research of international significance is identifying a new gene for dementia or something of that kind, as if that mattered more than figuring out how a model for social care of people with dementia could be implemented. I know which I think is the more valuable piece of work, but I don't think that universities more broadly see that in the same way. (Policymaker 1)

Academic research was seen by many Fuse members as an area of broader exploration, whereas policy-related knowledge was seen as an area charged with answering narrower questions.

Therefore, the understanding of quality of research differed widely across different contexts. Research considered to be of lower quality by the academics (for example small, locally based projects) was not seen as such among the policymakers. Quite the opposite: the vast majority of research users named the high quality of research produced by the organisations as among the key facilitators of the collaboration. These differences were stemming from varying understandings of research quality and quality criteria across different groups. For example, in academia, a poster presentation would not be considered to constitute evidence of the highest quality, but one of the interviewed policymakers mentioned that he used a poster created by a Fuse researcher in decision-making.

Some scholars have argued that the quality assessment criteria of evidence should be broadened to include issues such as its social relevance or appropriateness to contexts (Boaz & Ashby, 2003; Nowotny et al., 2001; Parkhurst & Abeysinghe, 2016). These points are valid, particularly considering the issues with hierarchies of evidence discussed previously. However, as suggested by the experiences of academics associated with Fuse and the Genomics Forum, the practical application of the calls for appropriateness could be challenging for two main reasons: firstly, production of relevant knowledge and its application are not always separate processes; secondly, production of relevant and "excellent" knowledge might in fact entail two separate sets of practices. These tensions will be further explored in the following section.

5.3. (POLICY) RESEARCH AS A PRACTICE

The previous section has argued that there are important differences between the institutionalised discourses of knowledge within academia and within policy. It has explored differences in terms of the epistemic contents of different forms of knowledge in policy and academia (e.g. the scope of the question, the level of abstractedness) and multiple enactments of research quality in different settings. These differences posed a challenge to academics working on impact projects, not only in terms of conceptual implications for the contents of policies, but also in terms of everyday practices of impact. It is because these various classifications of knowledge required different practices, and translation between them proved to be difficult. As highlighted in the perceptions of many of the academics working in both Fuse and the Genomics Forum, once research was produced in a way that was aligned with either excellent research or policy research, it was difficult to fully and directly translate it into the other format. For example, one of the Genomics Forum associates pointed out that one of the main challenges for knowledge exchange work conducted by the Forum was the fact that the research knowledge that the Genomics Forum was supposed to "exchange" was not initially produced with its applicability in mind:

> So, trying to use research that wasn't really maybe conducted in the first place with that intention to then inform policy was innovative, but was also problematic, and I think probably showed some lack of foresight in the ESRC when they established these centres, I'm not sure that they had the mandate to be as policy relevant as they then hoped the work would be when they had established the Forum. (GF 6)

These experiences of academics working for the two organisations were in a clear contradiction to the conceptualisation of the relationship between research excellence and research impact as set up in science policy documents (for example discussed in Chapter 2 Sections 2.4. and 2.5). As discussed earlier in this thesis, these policy documents present the relationship between the research and impact as causally linked, implying that excellence would lead to impact.

So far this chapter has presented some reasons why this conceptualisation is not realistic, since excellence of research and impact stemming from research are based on different understandings of knowledge and sets of practices. At the same time, the

framing of "excellence with impact"[29] is widespread and institutionalised in academia; hence the academics from Fuse and the Genomics Forum had to design their practices in such a way as to satisfy the criteria of both excellence and impact. This section will explore the ways in which the academics dealt with this problem, by looking at the sets of practices they conducted and the different institutional logics these practices were based on. Then it will explore strategies aimed at creating a hybridity of the two logics in a way that would satisfy the legitimacy criteria stemming from both logics.

5.3.2. Different types of knowledge practices

The practices conducted by the academics associated with Fuse and the Genomics Forum, as I argue in this section, could be categorised into three broad groups based on the type of knowledge they were focusing on: producing academic research, translating academic research into a format useful to policymakers, and producing policy/practice research. These different types of activities draw on different institutional logics and the process of navigating between these practices determined the type of hybridity the two organisations were practising. A summary of the three types of activities is presented in Table 6.

The first category of practices entailed traditional academic work – conducting research and publishing it in academic journals. Even though the formal goals of both organisations went beyond conducting research, either by broadening it (as was the case with Fuse) or by excluding the performance of primary research as an overall goal (as was the case with the Genomics Forum), the academics still considered research production as one of their central activities. Some of the academics in Fuse even claimed that conducting "world-class research" was Fuse's primary goal. Conducting academic research was also perceived as expected by the funders, since the reporting to research councils included publications and conference papers.

[29] See for example: https://www.ukri.org/innovation/excellence-with-impact/ [accessed: 28.08.2018]

Table 6. Types of practices of knowledge exchange organisations.

	PRODUCING ACADEMIC RESEARCH	**TRANSLATING RESEARCH**	**PRODUCING POLICY RESEARCH**
Type of activities	Conducting primary research, publishing	Seminars, workshops, policy briefs, blog, website, media relations	Contracted research, evaluations
Relationship to context	De-contextualised	Contextualising	Contextualised
Dominant institutional logic	Logic of excellence	Logic of excellence or logic of impact	Logic of impact
Timescale	Long-term	Long-term or short-term	Short-term
Type of impacts	Conceptual	Conceptual/ Instrumental	Instrumental

This expectation was viewed as paradoxical by some of the interviewees, particularly those who saw Fuse's main role as working towards the improvement of policy and practice, for example:

> We got funding to do knowledge exchange ... And every year, we have to submit a report to the [funders] about what we've done. And if you look at the guidelines for that report, it's about publications and grants. And as an afterthought, oh, knowledge exchange. But the first thing you ask for is for grants and publications. So, even for a dedicated partnership that is funded to do knowledge exchange, there's still the classical academic criteria applied, which I found fascinating. That sort of split thinking, as long as that persists, it will always be the struggle to get knowledge exchange in the agenda of academics and researchers. (Fuse 3)

A similar tension was perceived by the members of the Genomics Forum. The institutional setting of the organisation made it particularly challenging for the academics, as the Forum was not formally charged with conducting primary research. At the same time, some of the staff were still full-time academics, and were therefore required to produce REF submissions, presenting high-quality academic papers. As a result, the academics had to navigate these two contradictory expectations, in order to be accountable both to the ESRC as the Genomics Forum funder and to the REF and the university management coordinating the REF. For instance:

> I had hardly any time for primary research. I took time out to do other bits of research. Probably about 10% of my time I was also on research projects that weren't directly part of the Forum […]. And then some publications coming out of other research. Although they all had some sort of link to policy and in some cases to genomics, about 10% of the time I was not really doing the Genomics Forum research and that was the main… for what then became my REF publications. That 10% was what went into the REF. But the rest of the time I was either doing knowledge exchange in the Forum or the admin work around facilitating, making possible the knowledge exchange. (GF 3)

Some of the interviewees saw the research requirement as detrimental to effective knowledge exchange:

> It wasn't supposed to do research [but knowledge exchange], and yet all the people who were appointed to work in it were expected to demonstrate that they were research active and REFable. That was an enormous tension. That's why I'm saying they couldn't, under those circumstances, deliver what the ESRC was expecting from the Forum. It was a lack of realisation and understanding that stretched back even to the appointment of the directors of the Genomics Forum at various points in its life. Because of the pressures at the university level, they appointed the kind of director that was REFable, not the kind of director that would help other people to deliver their impact. (GF 8)

These quotes point to another characteristic of policy and research knowledge. When discussing various knowledge practices and problems with them, the academics keep referring to university structures, for example structures, roles and processes for managing REF. These institutional practices at the university level – practices of support and control over research and impact – seemed to magnify the tensions between the two logics. In other words, universities managing research and impact as two separate entities reinforced the perception of the two as being significantly different and requiring distinct approaches.

The second category of practices entailed a range of activities aimed at translation of academic research and dissemination of the results in a more accessible format. The strategies that could be placed in this category include, for example, seminars and workshops, briefing papers, evidence submissions, etc. Translation activities were more complex than the other two categories of practices in terms of their grounding in a specific institutional logic. These types of activities were the most hybrid since, depending on the organisation's approach to implementing them, they could be

grounded on either of the two logics. One reason for this is that some of the activities, such as organising seminars or workshops, were well established in academic life and academics historically organised such events to validate and disseminate their findings (e.g. Schaffer, 1983). This was evident in both cases, as organising seminars was the first type of strategy both organisations employed in the early stages of their work. In terms of their epistemic contents, the translation activities are positioned between purely academic and purely policy knowledge, as their core aim was to contextualise academic knowledge so as to enable its use in policy. At the same time, various types of strategies within this category differed in terms of how successful they were in actually making academic knowledge applicable. These tensions are presented in greater depth in the following section, which looks at seminars and workshops in detail.

Finally, the third group of practices included producing knowledge directly applicable to policy problems, for example as a part of commissioned research and evaluation. This group of practices involved the production of knowledge that was responsive to policy needs and was intended to be directly applicable in decision-making. This strategy was employed more widely by Fuse members and was recognised by the vast majority of interviewees as a type of activity that had the best prospect of being taken up by policymakers. This third category of practices also highlights a false distinction between research and impact practices, as it shows that oftentimes achieving research impact would indeed require the production of new research. But this type of research differed from purely academic research, as it did not comply with the expectations placed on academic knowledge production (such as objectivity, universality, quantification, and exploratory questions as discussed in the preceding section). Instead, this type of knowledge and knowledge practice was the most closely aligned with the logic of impact, as it involved a closer collaboration with policymakers, responsiveness to policy problems, and production of contextualised knowledge.

Even though the two organisations conducted activities aligned with all three categories of practices, the proportion of various strategies differed. The Genomics Forum was focused mostly on the second category of practices, as seminars and workshops were their main strategy. As discussed above, the academics still conducted

academic research but it was regarded as an additional activity. Fuse's strategies were more diverse and included activities across all three types of practices.

5.3.3. Legitimacy

The preceding sections have argued that knowledge produced for academic and policy purposes differed from each other and consequently were linked to different sets of practices. An important aspect of the two knowledge exchange organisations was their location at universities and predominantly academic affiliations of their associates. It is especially significant considering that not all practices discussed in the preceding section would be considered equally "academic", and so had varying credibility and legitimacy for academics. For example, some of the academics involved in the Genomics Forum conducting mainly activities in the "translation" category reported being perceived as "administrative staff" (GF1) by other academics. Similarly, as recalled by one of Fuse's associates, conducting only directly applicable AskFuse projects would risk "being an academic at the end of a career" (Fuse 8).

Even though the differences between different categories of practice could sometimes be quite blurry, there was a line that could be identified beyond which an activity would cease to be considered "academic". This tension could be illustrated by contrasting the experiences of associates of the Genomics Forum and Fuse. The Genomics Forum's members perceived their association with the organisation to be potentially harmful to their academic careers. For example:

> I mean I do think that our academic reputation suffered. And I think I could say that quite categorically... so maybe not all of us, but many of us who were there who held PhDs and who have returned to academic careers afterwards, our reputation suffered... and for myself I definitely felt like I was perceived differently from other staff at the same grade, even though my job title included "research fellow". When you go into knowledge exchange work as an academic, all of a sudden you are not taken as seriously, which is a problem, given especially that now we are all supposed to be doing knowledge exchange work. (GF 1)

However, some of the other members did not see it as categorically harmful, particularly those, such as the research fellows, who perceived their role as mainly that of producing research. This group of interviewees pointed out that the Genomics Forum provided an opportunity to develop a network of contacts including leading academic and policy staff, which was considered beneficial to one's career. At the

same time, it was acknowledged by the management of the organisation that staying in the Genomics Forum "for too long" (GF4) would not be favourable for early career researchers who wished to have an academic career.

Academics associated with Fuse perceived the career effects of impact work somewhat differently. A high number of academics discussed it in a positive light - in terms either of their own careers or of the overall incentive system in academia. One interviewee even ascribed a recent promotion to impact work. Nevertheless, few of the interviewees spoke of knowledge exchange as damaging their academic reputations. These academics gave examples of work that could be categorised as policy research (see: Table 6) – for example, work as researchers employed in the NHS or in an embedded role in a policy and practice department.

These perceptions indicate the delicate balance between the two institutional logics guiding academia (discussed in detail in Chapter 2 Section 2.3.). The practices falling into two categories – policy research and translation research – were not considered legitimate on their own, as illustrated by the cases of academics' careers suffering as a result of engaging in impact work. Accordingly, conducting academic research, thus complying with the standards of "excellence", might be seen as a baseline practice the need for which must be satisfied for the other two groups of practices to be considered legitimate. But – conversely – doing too much of the impact-related work would start to threaten the person's academic standing. For example:

> It was important not to sacrifice excellence for something else, and the something else was the translational agenda. That it had to be relevant, and applied and accessible and to answer the questions the practitioners and policy makers wanted answered, but you still had to do it in an excellent fashion. So you're just riding those three horses really. (Fuse 11)

The above quote points to the issue of hybridity of knowledge exchange practices, as the academics were expected to produce both impact and excellent research. However, the notion of "sacrificing excellence for impact" is significant for the understanding of legitimacy in this pluralistic environment. As highlighted by scholars writing in the field of institutional and organisation studies (Colyvas & Jonsson, 2011; Johansen, Olsen, Solstad, & Torsteinsen, 2015; Kraatz & Block, 2008) pluralistic environments, such as contemporary academia, are characterised by a complex interplay of different modes of legitimacy. In cases where an organisation's legitimacy is dependent on

multiple audiences (as is the case with knowledge exchange organisations), different organisational practices might be guided by various logics (Smets et al., 2015). Furthermore, different legitimising actors and organisations (e.g. universities, REF, research users, other academics) might invalidate each other's value assessments (Kraatz & Block, 2008). For instance, an action that would be assessed as highly useful by policymakers might be perceived as not sufficiently excellent, through the mere fact of its value to non-academics:

> In fact, I have often been quite critical about it [AskFuse], because I'm also an academic and I also think we should do world-class research, and if you spend a lot of your time evaluating small, local projects, and come in too late, with too little, with something quite confusing, then you can easily lose all your resources, to just do that. I think in order for it to work, and that's why I was referring to the incentive system, you need to make it work for both sides. (Fuse 8)

The quote above points to primacy of producing academic research over impact-oriented activities. Paradoxically, production of primary academic research would not be considered an effective strategy for influencing policies (as discussed in preceding sections), yet was seen as necessary for legitimising policy-oriented knowledge exchange practices. At the same time, the direction of this legitimising process seemed to switch during the lifespan of the two organisations. Initially (in the mid-2000s) producing policy knowledge and translating knowledge seemed to *invalidate* doing academic research (as described by GF1 on page 143). However, more recently, and particularly post-REF, conducting academic research seem to *validate* the more impact-oriented practices (see: Figure 2). This dynamic might be illustrated by a quote from one of Fuse's associates: "as long as you're doing good research, that's [impact] a good thing" (Fuse 12).

As highlighted by scholars working in new institutional theory (for example Binder, 2007; DiMaggio & Powell, 1983; Meyer & Rowan, 1977), organisations implement and signal elements of their wider environment in order to gain legitimacy. By focusing on meaning, rather than rationality, these theories see this process as a central driver of organisational practices (Binder, 2007). Gaining legitimacy inherently involves navigating both uncertainty and ambiguity to enable the organisation to fit into this broader system of cultural meanings (Meyer & Rowan, 1977).

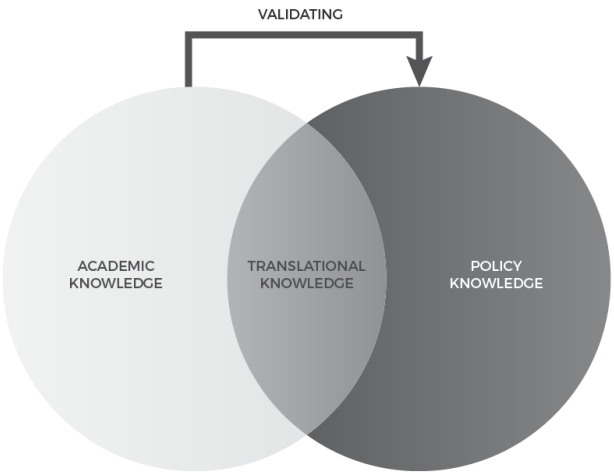

Figure 2. Legitimacy of knowledge exchange practices.

In the cases of Fuse and the Genomics Forum, this process would include adapting the meanings and practices to fit both the broader academic system of meaning as well as that of policy. These two cases seem to suggest that this could be achieved by creating a set of balanced, co-existing practices (rather than different practices replacing each other). In such cases the hybridity of the organisations would be achieved by finding a balance between the two sets of logics. This issue will be further explored in the following section.

5.3.4. Academia as a hybrid

Designing an organisational response to the problem of conflicting expectations placed on knowledge exchange organisations was a challenging task. Frenk (1992) has argued that organisational responses to balancing the excellence of research with its relevance might take on three different forms: academic subordination (where the research would be produced only in accordance with decision-makers' needs); segregation (where different parts of the organisation would be charged with complying with either excellence or relevance criteria); and integration (where relevance and excellence would be integrated within one project). This categorisation offers an intuitively comprehensive account of possible approaches to this problem; however, the empirical findings presented in this research point to a more complex reality of competing interests, values and objectives in the moves towards institutionalisation of any of these strategies.

The academics working for both the Genomics Forum and Fuse employed similar strategies in dealing with the issue of navigating different logics. The most common one, reported by the majority of interviewees who discussed this tension, involved a level of separation of activities aimed at producing academically "excellent" research and those aimed at producing impact. However, contrary to Frenk's (1992) model, separation of the activities aimed at relevance and excellence could not include relegating the responsibility for relevance to a separate unit or department, because of the barriers in academic incentives. As discussed previously, an activity would not be considered "academic" without at least a baseline of excellent research. The case of the Genomics Forum might be the best example here, as this organisation was established within university structures and charged exclusively with knowledge exchange. This model soon proved to be impossible to implement and eventually all the academic staff were driven to engage in at least some form of academic research in order to sustain their careers.

Instead, the strategy that aimed at separation of excellence and relevance involved balancing the number of policy-oriented, local projects with the number of academically-oriented projects. This approach of "compartmentalising" (Kraatz & Block, 2008; Smets et al., 2015) impact and academic research activities was not formalised, but rather relied heavily on perceptions of balance between different activities. The practice of implementing a "rule of thumb" in balancing different types of projects was illustrated by one of Fuse's members:

> AskFuse is a thing that people [in policy and practice] particularly like. But again, that's one of these tensions: if we put all of our energy in things like that, we will be in big trouble from the universities when it comes to REF. So you've got to get that balance. (Fuse 2)

This approach was reported not only on an organisational level, in terms of the overall types of projects the organisations were conducting, but also on an individual level, when academics divided up their workloads (for example in terms of specific days of the week when they did more academic or more policy-relevant projects). This shows that individuals had discretion in shaping the way the logic of impact and the logic of excellence were enacted on the ground. The institutional logics are not just externally imposed on individuals; rather, people on the ground experiment with them and act as "bricoleurs" of different institutional logics (Binder, 2007).

A second – and less common – strategy that aimed at navigating the two contradictory logics was to adapt the policy-oriented projects in such a way as to allow one to simultaneously produce academically excellent and policy-oriented knowledge. For example, one of the interviewees reported implementing within a local policy-oriented study a research strategy that involved shaping the research question and the analytical angle so as to yield academically excellent results:

> I do research that is with very much of a global outlook. So, we just completed a trial on [a health issue], but we have had people from the local government public health team involved in the development of the intervention – we had them involved in the evaluation itself and the trial. They are involved in disseminating their work back to them through Fuse. So, we have this local angle, it's a local trial, but the way we have set it up, the way we have evaluated it, also seeks to answer a broader question. Once those two things come together, I think you'll get really nice public health research. (Fuse7)

Some of the Genomics Forum members also implemented a similar approach to allow them to produce academic research while complying with the Forum's remit, which was limited to knowledge exchange and translation. For example:

> I came to the job thinking that I wouldn't have any research responsibilities and I hadn't wanted any research job responsibilities, I had worked for a government [department] beforehand, but gradually I decided that I do want to be doing research and so over, I don't know, just gradually over time, I started doing more and more research. And that was always a little bit tricky to define because we weren't funded to do research so A) I am going to have to get a separate funding for this and B) I kinda need to make it look like a knowledge exchange, whilst being research. (GF1)

Therefore, the integration of two conflicting logics might in fact require conducting a set of practices in a way that emulated a different practice: for instance, doing a research project that might be perceived as a knowledge exchange activity, or conducting a local study that might be seen as generalisable and universal.

At the same time – as foreseen by Frenk (1992) – integration of these two types of knowledge practices was quite challenging and not always successful. As discussed in Section 5.2, policy and science operate under different assumptions regarding acceptable levels of uncertainty of knowledge. These two understandings clashed in cases where the aim was integration of relevance with excellence. As one interviewee put it:

> You've got political drivers that don't necessarily allow you to go through a process that means you can do an evaluation in the way you want. The [public health project] is currently in a position where there's some political pressure mounting to disseminate the intervention from the west of Newcastle into the whole of Newcastle, even though the rest of Newcastle is effectively functioning as a control group for the thinking around that initiative at the moment. That's problematic because you've got that pressure to just roll the thing out at the same time as wanting to wait and find out whether or not you've got an outcome that you have hypothesised is going to emerge. (Policymaker 1)

A similar situation arose in a different Fuse project. A million pounds-worth evaluation was not completed and the funds had to be returned to the funders because the government had decided to roll out a programme without waiting for the results of the evaluation. Through this action, the control group was effectively compromised and the study could not be performed to the same level of academic rigour. Overall, as argued in this section, navigating excellence and relevance of research was perceived to be a challenging task and none of the strategies employed to address these tensions were perceived to be unproblematic. At the same time, the academics involved in the knowledge exchange organisation had to participate in this "balancing act" in order to maintain their dual legitimacy with both their academic peers and policy and practice partners. Hence, academics did not just exert the new logic of impact in practice. Rather, they navigated the two logics to create their own approach to impact by adapting elements of both logics in ways that would cause them to be deemed legitimate (Martin et al., 2017; Smets et al., 2015) while working towards achieving organisational goals (for example in terms of evidence-informed policy and practice change).

5.4. RELEVANCE AND EXCELLENCE IN PRACTICE

As highlighted in Section 5.3, different sets of practices – oriented towards producing primary research, oriented towards translating existing research, and oriented towards producing policy-relevant knowledge – were drawing to different degrees on different institutional logics. However, in order to be deemed legitimate, the academics had to balance both sets of expectations, and thus to project an image of being simultaneously impactful and academically excellent. This section will explore two vignettes of these types of practices to illustrate the inherent tensions affecting academics involved in

impact projects. The practices of organising seminars and workshops and conducting evaluations were chosen based on the centrality of these actions to the organisational strategies of the two case study organisations.

5.4.1 Seminars and workshops

As mentioned in the preceding section, organising seminars and workshops was one of the first knowledge exchange strategies implemented by both the organisations. This was not unanticipated, considering that this form of interaction has been historically used to validate and disseminate academic knowledge to non-academic audiences (for example in the form of public lectures, see: Schaffer, 1983). Seminars and workshops were also forms of engagement to which both policymakers and academics were accustomed. However, both the Genomics Forum and Fuse initially struggled with attendance of non-academic audiences. As highlighted by one of the Genomics Forum associates, organising things in the way they were used to only led to "talking to other academics" (GF 4). This was perceived as a challenge, since the academics from both Fuse and the Genomics Forum saw having a mixed audience as a key to successful interaction. As exemplified by one of the interviewees:

> I think what makes a good workshop is a mix of people. Obviously having a right speaker and a right issue and a right programme, but also having a right mix of people because some of the events tend to be academics speaking to themselves again. […] But I think when they worked best is when you have a good mix of people working from the third sector, coming from the community, coming from local government, coming from Public Health England, at the regional level. Then you get much more diverse, rich set of interactions and they can spawn more collaborations or projects (Fuse 1)

Academics associated with both organisations acknowledged that, with time, they adjusted their approach and worked towards better participation from non-academic audiences. This meant reflecting on what was of interest to policymakers and practitioners and how to organise events that would be relevant to their work, as illustrated by the following quote:

> So then it's about us evolving to have a meaningful offer to them, to other people, you know everybody's busy and we might think what we've got is the best thing ever but unless it's actually important to the people you're working with, they are not going to attend. So I think that's evidenced by the fact that our initial Quarterly Research Meetings, we might have 90% academics, 10% practice. And now I

> would say genuinely they're at least 50-50 if not unbalanced for practice and policy (Fuse 2)

The issue of making seminars attractive to different audience points back to an observation made previously in this thesis (for example, Chapter 3 Section 3.3.2.), that in order to make scientific knowledge "usable" (Lindblom & Cohen, 1979) academics have to be mediators between scientific and policy setting (Grundmann, 2017; Jasanoff, 2011b; Mitton et al., 2007). And in fact, in order to make the seminars and workshops more attractive to policymakers and practitioners, academics had to go beyond just disseminating and discussing academic knowledge. Both Fuse and the Genomics Forum implemented different strategies for making the meetings more relevant to policymakers[30]. Fuse's approach to mediation between academic research and the policy and practice setting involved contextualising research and providing clear implications for practice stemming from research. For example:

> And one of the things we've been able to do I suppose through Fuse is to hold these Quarterly Research Meetings where practitioners come together and we'll say, "Look this is the research we've done here and it reinforces stuff everyone's been doing everywhere else but it really does work and here is an example of how it works in this region". […] Bringing the evidence close to them and showing how it works or how it could work for them or how it links with their own local experience is probably quite important. (Fuse 11)

The key issue here is this process of what another interviewee described as "interpreting the evidence for them" (see also Chapter 6 Section 6.3.). This approach would encompass not only bringing a mix of people together but also translating the presented research into actionable points (Mitton et al., 2007; Pentland et al., 2011), and accordingly would imply a close involvement with the way research is being utilised. Such an active role of academics in the process of policy and practice change suggests that, while developing these practices, Fuse's members progressively drew more extensively from the logic of impact, based on co-production and direct applicability of knowledge in policy and practice.

The balance between the logic of impact and the logic of excellence was different for the Genomics Forum's events, as this organisation overall drew more heavily on the

[30] The differences in approach to these practices were shaped by multiple factors, including the different framings of the policy-science relationship (explored in detail in Chapter 6).

logic of excellence. The Genomics Forum's approach to mediation between research and policy assigned this role to the policymakers and practitioners themselves, rather than to the academics. During the workshops, it was the practitioners who would use their experiences to contextualise the academic research and discuss the potential consequences of the technological and political challenges stemming from genomics:

> I thought it was always our approach, this kind of workshop-y model, a dialogue-based model of, you know, literally bringing people into a room to share research, to share non-research experiences and perspectives and hoping they will cross-fertilise in some way and that something would come out of that. (GF1)

and

> They tended to be more workshops, and there what you're doing is exposing those policy makers to a whole range of ways of thinking about a topic without necessarily pushing them into taking advice or any specific type of advice. (GF2)

The question of "usefulness" of seminars and workshops for policy change was problematic. Members of both Fuse and the Genomics Forum perceived events as rarely leading to direct policy changes. For example, one of the policymakers saw the Genomics Forum's approach to seminars as insufficient to produce policy change:

> They were operating on a workshop mechanism. They brought people together in workshops. They expected some kind of impact to be an outcome of that, in terms of people being influenced by one another at the workshop. But they didn't have a mechanism to follow it up. […] They were quite good at attracting high profile people to come to their workshops, because they could meet other people, and talk to them in a way that they couldn't in more formal organisations. That, I guess, is a kind of impact that it's very hard to demonstrate. Without some kind of follow-up and some kind of long-term agenda, what you're doing, why you're doing these workshops and not other workshops, there wasn't that kind of long-term agenda, here's what we want to influence and here's how we're going to influence it. (Policymaker 4)

Even though Fuse's approach to seminars involved closer linkage with concrete policy and practice changes, it did not necessarily lead to a direct change either:

> [During the seminars] people could discuss what it means for policy, for their practice, they then made an action plan as to what they might be able to do with things that they had heard and discussions they've made, when they were away, and part of my role with some of the other researchers was to say: "Well, so what, what happens as a result of that? Does it change anything?" And we found that actually, it doesn't change very much because people got back to their day job in the desk.

> And things haven't changed, so the idea of just creating evidence and sharing it is not enough, there has to be more support, it has to be better embedded into ongoing plans and projects, and the way that these organisations work, to meet their priorities going forward, so it's not the point of sharing, it's not enough, it has to go beyond that. (Fuse 9)

At the same time, a direct policy change as a criterion of success seems to be quite rigid, particularly considering the literature on knowledge uses which points to a wide variety of different uses of research by policymakers and practitioners (Nutley et al., 2007; Weiss, 1979). And indeed, some of the policymakers who participated in the meetings pointed out that they benefitted from what one of the policy advisers to the government called "a lightbulb moment" (Policymaker 3), resulting from exposure to multiple perspectives. All of the interviewed policymakers pointed to the fact that, as a result of participating in the seminars, they started considering genomics as a societal problem that might be shaped by society's perspective on technology, rather than a purely technological or natural science problem. In fact, those policymakers who claimed that they benefitted from this broader learning admitted that they were the ones coming to conclusions on their own. Similarly, policymakers and practitioners involved with Fuse commented that they came to the seminars to keep up with the field and get some new ideas, rather than to change their practices or to seek support in decision-making. Therefore, consideration purely of the direct applicability of research would disadvantage these forms of practice, despite their having broader, more open-ended merits in relation to long-term policy change.

5.4.2. Producing policy-knowledge – AskFuse and evaluations

The tension between the logic of impact and the logic of excellence played out somewhat differently for the category of practice that would be most closely aligned with the logic of impact – producing knowledge in direct response to policymakers needs, for example via evaluations. The vast majority of interviewees perceived evaluations to be epistemically complex, combining scientific evidence, pragmatic considerations and political judgements. Therefore, it is an area where different institutionalised discursive understandings of knowledge, as discussed in Section 5.2, clash (see also: Bate & Robert, 2002). An illustration of this tension was provided by one of Fuse's associates, who presented clinical trial results to an audience of policymakers in London. Another speaker presenting during the same meeting

discussed a local evaluation of a service. This evaluation would be deemed of low quality according to academic standards: no academics were involved in it, and it included only a single site and a basic set of questions about satisfaction with a service. During the discussion, the Fuse associate was asked whether he thought the service discussed by the second speaker could be a viable option, based on his expertise. The researcher responded that answering this question would require a robust evaluation which would take approximately five years. He recalled that "As soon as I said five years, you could tell people just weren't interested" (Fuse 12); instead the policymakers in the audience turned to the second speaker who presented a less robust evaluation.

The problem of timeliness of research evidence is widely acknowledged as one of the key barriers to the use of research in policymaking (Davies et al., 2008; Lomas, 2000) (I will return to the issue of timeliness of research in policy in Chapter 7 Section 7.2.1). Therefore, one of the challenges for Fuse's associates was to produce evaluations in the shortest possible time (to make it still relevant for the stakeholders) while making the research methodologically sound:

> I guess it's all the same things as, you know, if you want to do a relatively thorough job, you can't really do this sort of research in about three or four months. You need a bit more time to collect the proper data, analyse it, and kind of make sure that during this period, it's still relevant to the needs of your stakeholders. (Fuse 13)

In the case of the project mentioned above, the researchers and decision-makers worked together in designing the project in a way that would satisfy both sides. However, even though the timeline did not exceed eight months, it was still difficult to maintain relevance throughout the project, as the decisions were being made with or without this research. At the same time, simplifying methodologies requires careful consideration; for example:

> It [a call for evaluation] was in sort of two to six months, and most current scientific methodologies to develop complex interventions take about two or three years. So, there's a massive discrepancy between the two and you need to find how you align those requirements with each other so you can start negotiating shortcuts, rather than making random shortcuts. You have to understand what matters and what matters less. (Fuse7)

This process of adapting the research design to fit the policymakers' needs was seen as very context-dependent and negotiable with the research users in a co-produced way (Durose et al., 2017). At the same time, some of the projects were conducted in a manner prescribed by the academics. The project most widely presented as a successful example of a project conducted to a high level of academic rigour, as well as to a high level of relevance to the policymakers, was a babyClear[31] intervention and evaluation:

> Once you start developing this joint understanding, you start co-creating knowledge, you start to identify potential solutions, you start to evaluate the solutions. That still takes many, many years. So the quality of the research coming through, again, this is an example of babyClear. Really, it's a whole process, from initially starting to talk with each other about doing something together about smoking rates amongst pregnant women in the Northeast, to actually having evaluated and implemented in this case, so that's another step, which studies it rather than just provisionally providing something as a part of an evaluation study, you're actually starting to gradually implement the new system in the service, and then you evaluate temporarily how outcomes changes as a result of these implementations. That alone probably takes around six, seven, eight years, so you need about a decade to be able to look into the fruits of the work, rather than just look into the process. (Fuse 8)

This evaluation, conducted in a way that was seen as exemplary both by policymakers and academics, represented a success story about how local evaluation projects might be developed. However, both groups of actors acknowledged that, in order to achieve this success, multiple different factors had to align, including for example, political will, investment, skills, relationships, timing, etc. (akin to Kingdon's (1984) concept of "windows of opportunity"). And in the majority of cases, some form of compromise between robustness and relevance had to be employed.

The experiences with adapting research questions and design to the needs of policymakers unveiled an important quality of this practice. Contrary to the majority of the literature which looks into the issues of methodological robustness and relevance of research at specific snapshots of time (McGill et al., 2015; Sanderson, 2002), the AskFuse case pointed to a dynamic relationship between the relevance of research and

[31] See: http://www.fuse.ac.uk/nihrsphr/involvementengagement/workingtoreducethenumbersofpregnantwomenthatsmokeinthenortheast.html [accessed: 28.08.2018]

methodological approaches to achieving it. The experience of conducting evaluations for local government, particularly via AskFuse, has highlighted the fact that actually, even though the understandings of good evidence are institutionalised, they are to a degree flexible and shaped by the interaction with academics (which will be further explored in Chapter 7 Section 7.5). The majority of the interviewees reported changes in approach to, and understandings of, the research process on the part of both policymakers and academics. One of the changes reported by many Fuse members concerned improvement in AskFuse requests over time. For example, as highlighted by one of the academics:

> I think the audience expectation has matured. To begin with, people were probably expecting something fairly immediate, that once AskFuse was established, questions would be answered and solutions found. I think perhaps, one of the benefits of Fuse, the collaboration and the close relationships we have with them, is that they can have a better idea of the research processes now, and what kind of things can be researched, what kind of things can't be. What can be researched effectively, the time it takes, and I think it's a much better across the board understanding, now, for everyone involved, on how research can help solve inequalities, or contribute to solving inequalities. (Fuse 6)

Having a responsive service was highlighted as one of the important facilitators of learning, as it allowed the process of learning to be contextualised and supported by social interaction (Sanderson, 2002). The majority of the interviewed AskFuse users pointed out that the most valuable outcome of the interaction was a change in their own governing practices, in terms of how to design better processes of intervention and evaluation (I will return to this point in Chapter 7 Section 7.4). Additionally, the decision-makers and practitioners were seen as improving their ability to "translate their practice issues into researchable issues" (Fuse 14).

Finally, the academics also learnt how to mediate between academic rigour and applicability of knowledge. One way would be to use evaluation methods aimed at producing contextualised knowledge, for example:

> Well, certainly my end of the organisation, we've now got quite an expertise in realist evaluation, which I think has been purported as one of the key approaches that has made the most impact for policy makers, because we can actually give people quite specific advice about what is effective, for which population in which circumstances. We've moved on from the generic "this approach works for some people some of the time" to be able to allow people to be quite be spoken at how they spend

> their funding, help be spoken at how they set up services, so they have a heightened potential of effectiveness. (Fuse 14)

As highlighted in the above quote, academics have improved over time in producing knowledge that would be directly useable by policymakers, rather than just presenting abstract findings.

5.5. CONCLUSIONS

This chapter has explored the ways in which the two institutional logics present in contemporary UK academia are being enacted in the everyday practices of academics associated with Fuse and the Genomics Forum. The point of departure of this chapter was an observation that academic and policy knowledge differ in terms of their epistemic contents (e.g. contextualised and decontextualised knowledge) or practices of its development (for example in terms of abiding by the standardised rules of methodological rigour). As such, this chapter argued that the notion of "excellence" does not travel well beyond academia, as the ideas behind what constitutes good quality research were considerably broader for policymakers and practitioners.

This chapter has discussed the tension between relevance and excellence of research as separate sets of practices with different epistemic and institutional underpinnings. Even though these three types of practices – producing academic research, translating research, and producing policy-relevant research – are distinct in terms of the types of knowledge they produce, the types of impacts they are aiming to achieve, or the types of strategies they involve, the practices should not be seen as linear or stage-like. For example, some academic research activities are initiated by the questions that emerge during seminars or evaluations. Some of the policy-oriented projects, such as evaluations, are initiated as a result of translational activities. Furthermore, the boundaries between different practices are not clear-cut, and at times (particularly for researchers doing applied public health) they were quite blurry.

Furthermore, the legitimacy of different practices is a factor linking them together. As shown in this chapter, in the past translating research and producing policy-relevant research used to invalidate producing academic research (hence damaging the academic standing of academics conducting knowledge exchange). More recently (particularly post-REF), the directions of the legitimising dynamic have changed and

conducting academic research started to validate conducting translational and policy-relevant activities. Therefore, for the academics working in knowledge exchange more recently, these types of activities posed a career benefit rather than risk. One of the key determinants of the change toward the acceptability of impact work as an academic practice is the change in the incentive system initiated by REF.

Finally, this chapter has explored ways in which the academics develop hybrid practices, aiming to combine excellence and relevance of research. The chapter identified two main strategies: separating the two types of knowledge practices (for example across different projects) or integrating them within one project. Overall this chapter has shown that excellence and relevance of research are both separate but closely linked phenomena. As such, the logic of impact is implemented in practice not by its direct application but rather through a locally situated hybridity within which the academics tested the boundaries of these newly emergent practices.

CHAPTER 6

KNOWLEDGE TO DO WHAT? – FRAMINGS OF KNOWLEDGE EXCHANGE

6.1. INTRODUCTION

The two models of science-policy relationship at the centre of this thesis – assuming separation or integration of the two – entail radically different understandings of the role of science in society. This thesis has thus far explored ways in which contemporary academia is driven by contradictory institutional forces grounded in these models, expecting science to be simultaneously autonomous and closely embedded in the social context. This was evidenced by looking at the way the research impact agenda – an embodiment of the integration approach – has been institutionalised in UK academia via a logic of impact which emerged alongside the traditional academic logic of excellence. The previous chapter has explored the hybridity of practices of knowledge exchange, combining producing academically excellent research, policy relevant research and translation between the two. In the process, this chapter demonstrated that academics working in knowledge exchange adapt to the institutional change initiated by the research impact agenda by combining elements of two logics – of impact and of excellence – in ways which would cause their practices to be deemed legitimate by both policymakers and the broader academic community.

This chapter will in turn focus on symbolic structures embedded in the two logics. I have thus far argued that these two logics, among other differences, contain different symbolic foundations, as is evident from their different understandings of science (discussed in detail in Chapter 2 Section 2.5.). The logic of excellence sees science as a resource for policymakers, driven by the quality and robustness of evidence, whereas the logic of impact sees science as directly involved in problem-solving and driven by the applicability of research outputs (see also: Berman, 2012a). These two models have thus far been analysed on high levels of academic and funding institutions. Here, the

focus will turn to meso- and micro-levels as this chapter will explore how these changing understandings of science (via science's relationship to policy) are implemented and enacted by the organisations and individuals charged with knowledge exchange.

As previously discussed (for example in Chapter 1 Section 1.2 and Chapter 3 Section 3.3.3.), STS researchers have been examining the way expertise and the cognitive authority of experts are constructed and performed. Particularly relevant here is a discussion of the boundary between academics and experts in the policy sphere. Such authors as Jasanoff (2011b) and Grundmann (2017) have argued that the role of an academic and the role of an expert in policy are not interchangeable, as policy knowledge is not interchangeable with academic knowledge (see also: Chapter 3 Section 3.3.2 and Chapter 5 Section 5.2). Therefore, the key identifier of expertise consists of a mediation between knowledge and the practical setting reconciled by social attributes of expertise (Grundmann, 2017).

The institutional context of the UK poses a challenge to this duality. Even though the two roles – of expert and of academic – are conceptually different, the institutional setting of UK academia increasingly blurs the boundary between them. With the expectation of producing "impact" placed upon them, UK academics have to focus not only on problems but also on solutions, which inevitably requires linking scientific and practical considerations (see also Chapter 5 Section 5.3). In this context, knowledge exchange might be conceptualised as an area where these changing institutionalised understandings of science and expertise emerge. And the way institutionalisation of ideas happens is through symbolic representations such as theories, frames or narratives (Thornton et al., 2012). In this chapter I will continue the exploration of academic institutions as "inhabited" (Hallett & Ventresca, 2006; Weber et al., 2013) and examine the process of sense-making (Weick, 1995) aimed at understanding this changing new environment.

This chapter will therefore explore how the symbolic representations of knowledge exchange were constructed. According to Goffman (1974), frames are "schemata of interpretations" through which actors "locate, perceive, identify and label" social reality. Therefore, frames are crucial in understanding social phenomena, as they help the actors to make sense of them, organise meanings and guide practices (Goffman,

1974) and as such are central to the sense-making of actors within institutions (Scott, 2003). At the same time, framings not only guide practices but also emerge from practice (Schön, 1983). The academics associated with knowledge exchange organisations did not (and could not, considering the recent developments in research funding) just take on a pre-existing, defined role of an academic in the policymaking process, but rather constructed the framing of what this role would entail and how it could/should be performed, drawing on the existing institutional framings of academic work and its value, as well as on their own experiences.

The chapter will begin by exploring how the academics I interviewed made sense of impartiality and autonomy while engaging with the politics of the policymaking process. Building on that, I will explore the emerging framings of knowledge exchange, in particular in relation to the perceived outcome of knowledge exchange activity and its positioning in relation to non-academic stakeholders. Furthermore, I will explore how these framings of "science" affected the framings of the "academic" who practises this new science, hence affecting the academic identities of members of the Genomics Forum and Fuse.

6.2. IMPARTIALITY AND AUTONOMY OF KNOWLEDGE EXCHANGE

6.2.1. Impartiality in a political arena

The notion of the impartiality of policy experts is inherently paradoxical. As argued in Chapter 3 Section 3.3.3, many scholars writing about expertise highlight the impartiality of experts as one of their defining characteristics. The assumption that experts possess significant "moral virtue" (Grundmann, 2017) is one source of the cognitive authority of experts, since lack of a stake in the policymaking process should, at least theoretically, translate into more objective advice. This is of course in stark contrast with the fact that experts are expected to get involved in the very process of policymaking (and consequently, the politics of it) in which they are required to be impartial (Bijker et al., 2009).

This problem was a starting point in the analysis of the interviews with academics involved in knowledge exchange organisations. And, in fact, the interviews confirmed impartiality as one of the central values of academics, and no interviewee completely

rejected the notion of impartiality as important for effective knowledge exchange work. Quite the opposite – the interviewed academics perceived themselves as characterised by at least some degree of impartiality. At the same time, the vast majority of interviewees acknowledged that they were not perfectly neutral in their views or objectives. For example, even the interviewees who strongly supported the notion of impartiality as a prerequisite of successful knowledge exchange work did not frame it in absolute terms, as complete neutrality or separation from politics. This is akin to recent work on academic advocacy (Smith & Stewart, 2017b) which has shown that academics in public health do not perceive impartiality or lack thereof as a dichotomy, but rather as a continuum between the complete detachment of an "ivory tower" academic at one end of the scale and political activism and advocacy at the other end. As highlighted by Smith and Stewart (2017b), these two extreme ends of the scale are found very rarely in contemporary academic life in the UK.

And indeed, the data presented in this thesis confirmed these findings - academics working in knowledge exchange organisations seemed to take on this more nuanced, scalar view of impartiality. Moreover, the interviewees across both organisations expressed different understandings of what constitutes impartiality and mobilised this concept for different purposes. As I will show in the following sections, academics had to adapt the understanding of impartiality when faced with new institutional pressures to engage more systematically with non-academic audiences. In a context where complete impartiality was not plausible (considering the political nature of the policy work), academics employed a number of rhetorical strategies to maintain their claims to impartiality as well as to expand their authority into new policy territory. The two main understandings of impartiality that emerged in this setting entailed: impartiality understood as refraining from engaging in debate over policy options, and impartiality understood as promoting evidence. The following sections will look into these two strategies for shaping the understanding of impartiality in detail.

Impartiality of non-partisanship

The first understanding of impartiality involved seeing it as political neutrality. The issue of impartiality was particularly salient for many academics employed in the Genomics Forum, the majority of whom discussed impartiality as a central identifier of their organisations and work. This could be exemplified in the following quote:

> We had the advantage of not being a partisan organisation. We didn't have an agenda... an explicit agenda. Of course everyone has perspectives they bring to bear on their work, I'm not saying we're some perfectly neutral organisation. But we didn't have a specific policy agenda we were pursuing. So far as having a specific agenda, it was merely to promote social science and policy in other circles […] Because the Forum isn't [partisan] like that, it's able to be a kind of more of a fair player, bringing more people to the table rather than just one group or another group. So, its approach I think allows for a larger conversation than what happened if you had a specific policy commitment that was driving the organisation. (GF 5)

As illustrated by this quote, many interviewees understood "impartiality" as tantamount to "non-partisanship". This did not mean that they considered themselves completely devoid of interest and stakes, quite the opposite. Many of the interviewees, including GF5 quoted above, admitted that values and interests are inseparable from any academic or political activity (which is unsurprising, considering the STS background of many of the Forum's employees). Therefore, they did not regard impartiality as absolute neutrality but rather considered it in the more procedural sense - of creating a specific environment which could be perceived as neutral and which in turn would be conducive to learning. For example:

> We were trying to be distinctive, because we were offering academic, nonaligned, disinterested in almost a Mertonian sense, kind of insights into this. Of course, I've already said that we had all these interests, but also that we organised some events with think tanks, we organised some events with the universities in London, or NGOs, and so on. Often those were very successful, but we do think of ourselves as rather different from think tanks in that, by and large, we didn't have a policy line that we were promoting. (GF 4)

As illustrated by this quote, academics who signed up to this understanding of impartiality saw it as a factor assisting the realisation of the knowledge exchange goals: supporting dialogue and reflection among different actors. Being non-partisan was seen as a necessary condition for creating a supporting learning environment. Endorsing a specific policy option would, according to this framing of impartiality, be detrimental to learning as it would just recreate the existing policy debate in the knowledge exchange space, rather than opening-up the debate to new insights. Therefore, taking sides would potentially reduce the scope for new, alternative ways of thinking about the policy:

> It seems to me that's [being non-partisan] going to be more useful to policy makers than taking a partisan approach on what we think is the right or the wrong line because that's inevitably going to fit. That's either going to support their agenda or it's going to contradict their agenda, but it's not going to inform their agenda. What we can do is inform the way that they think about it. (GF 3)

As highlighted in the quote above, this approach to impartiality entailed an implicit understanding of the goal of knowledge exchange, namely to open-up discussion to different possible policy options. And by not aligning themselves with the dominant partisan positions on problems, the academics were able to achieve two important epistemic goals: firstly, maintaining the traditional epistemic authority of science (discussed in Chapter 3 section 3.3.3) as stemming from representing the truth about nature rather than political considerations; and secondly creating an epistemically open environment allowing for broader learning (discussed in further detail in Section 3.2 of this chapter).

Impartiality of evidence

In contrast to the framing of impartiality as non-partisanship offered by the Genomics Forum's academics, the majority of the interviewees based in Fuse did not discuss impartiality as central to knowledge exchange. At times it was even seen as a potential barrier to successful evidence-based policy change. One of Fuse's members explained:

> And being an advocate for the policy change, not just a traditional stand-back academic who produces a work and then does not seek to animate that work or advocate for it. It's going to be a step further into using it in a political sense, I suppose. But not in a sense that's polemical but it's grounded in evidence. And it can be backed up by the evidence. (Fuse 1)

As highlighted in the quote above, some of Fuse members saw impartiality as a concept used by "traditional academia" (e.g. Fuse 1, Fuse 3) to justify their lack of involvement in policy and therefore in the achievement of desirable changes in policy and practice. Many of the interviewed public health scholars saw advocacy as a form of engagement with policy that was acceptable or even encouraged (see the discussion in Section 3.4).

However, this does not mean that the interviewees would call for political activism and deny the notion of impartiality completely. Quite the opposite – impartiality was still a guiding principle for the interviewees' actions; however, just as in the case of

the Genomics Forum, the academics reframed the meaning of impartiality to fit the new institutional setting. As a result, many of the academics employed the understanding of "impartiality" to mean support for evidence-based proposals. According to this view, involvement in policy was seen as justified and still within the boundaries of academic impartiality as long as the proposals academics were advocating for were based on a grounding of rigorous evidence. Almost all interviewed Fuse's associates echoed this distinction between just advocating for different policy options and advocating for evidence. In that sense, the interviewees did not call for political activism or partisanship. Rather, they saw the role of an academic in the policymaking process as that of a critic of policies which were not based on evidence and advocate of solutions that had not been implemented in government policies:

> You know, [Fuse] is impartial other than having the goal of improving public health, which you could actually argue isn't impartial, but there you go. Because when it comes to things like having to stick your neck out and say, well, the government's policy on sugar or alcohol pricing – or whatever it is – is quite patently wrong, I mean, it's important to be able to do that, but that would be backed up with evidence. (Fuse 4)

Overall, as argued in this section, the notions of impartiality remain central to academics' work and were linked to such issues as credibility and effectiveness of knowledge exchange. At the same time, the views on impartiality were nuanced and entailed different levels of engagement with specific policy debates (as both groups of academics linked too close an alignment with a particular policy debate to a potential loss of authority). This section has shown that the meaning of "impartiality" is malleable and could be conceptually stretched to fit the political setting of policy engagement. This process of shaping the meaning of impartiality did not affect its conceptual core (as a source of epistemic authority), since the research users unequivocally deemed the academics working for Fuse and the Genomics Forum to be politically neutral (and in fact, linked this quality to the value of academics, which will be discussed in detail in the following chapter in Section 7.3.3).

6.2.2. The proximity of research and policy problems

The second traditionally academic value that is seen as challenged by the research impact agenda is that of autonomy. As discussed in Chapter 3, the notion of academic autonomy from policy is somewhat paradoxical, as the autonomy is seen as both the guarantor of the authority of science (e.g. Haas, 2004) and a barrier to the uptake of

knowledge in policy (Gibbons et al., 1994). The vast literature on knowledge utilisation and exchange emphasises that involving the users of research in the research process increases the potential for the research to be taken up in policy (Hering, 2015; Holmes et al., 2017; Oliver et al., 2014; Ward et al., 2012). These contradictory understandings of academic autonomy and its role in policymaking proved to be challenging in practice, as academics working in policy-sponsored research pointed to problems in combining research applicability with academic autonomy (see also: Smith, 2010).

Again, as was the case with impartiality, the data overwhelmingly point to autonomy of science from policy as a problem of scale, rather than a binary concept. Many of the interviewed academics had to navigate between those elements of academic culture and practice which could change in order to meet the expectations of closer engagement with policy, and those elements which should be protected. This issue seemed contentious for some of the interviewees who perceived their organisation as either too close (particularly for some Fuse members) or not close enough (particularly in the case of the Genomics Forum) to the policymakers to achieve their goals. Nevertheless, the vast majority of interviewees acknowledged a need to work closely with non-academic partners as a key to knowledge exchange and impact work. Hence, it seems that the issues of autonomy and impartiality were not necessarily seen as linked together, akin to Douglas's (2009; see: Chapter 3 section 2.2.3.) argument.

Yet, even though the interviewees acknowledged the need to work closely with various stakeholders, the scale of involvement and autonomy was debatable. Here again, the two framings of the acceptable proximity to policy could be identified among the interviewees (and will be discussed in more detail in the following sections). These two framings differed significantly in terms of the positioning of academics vis-à-vis policy problems. The first framing assumed that collaboration with non-academic actors should be separated from concrete policy questions. This way of approaching this paradox of autonomy of knowledge exchange was to endorse the autonomy of science not *from policy* but rather *from policy solutions*. The second approach assumed close collaboration with policymakers both in shaping the questions and in producing knowledge that might aid in answering them.

Research as a separate voice

As was the case with impartiality, the concept of autonomy was closely linked with the underlying framing of knowledge exchange, but also with the values and motivations of academics. The first framing of autonomy in the context of knowledge exchange work assumed a close link with current policy and academic debates, but not one that involved directly addressing policy questions or problems. This framing could be illustrated by the following quote:

> I think on the whole it [the Forum] was helping them [policymakers] to frame the way that they thought about policy issues in ways that they hadn't necessarily considered previously. I don't think we were ever really in a position to answer pre-existing policy questions. (GF 3)

As highlighted in this quote, this perspective on autonomy assumed that science's role is to focus on problems rather than solutions (akin to Weiss, 1977, see: Chapter 3 section 3.4.). Yet, highlighting the conceptual distance between research and policy does not necessarily entail the absence of engagement with the research users. In other words, separation from the policy questions did not mean separation from policy actors. This framing of autonomy within shared spaces might be illustrated by the Genomics Forum's strategy. The dialogue-based formats employed by the organisation, such as workshops or seminars, both depended on engagement with non-academic partners and assumed a separation between research and policy. Members of the Genomics Forum described their main model of operation as "bringing people together" (e.g. GF1, GF2, GF3). The main strategy here was to bring a variety of different people, for example policymakers, practitioners, scientists and social scientists, together in a room and facilitate the dialogue between them to promote mutual learning. This approach could be exemplified in the following quote:

> I think it did successfully become a space for dialogue. I don't know that I can say that like "oh it changed this policy in this way", but I think it did. It was a safe space for people to come and talk about things and I think over the whole number of different areas we covered we managed to build at least some of that reputation. (GF 2)

In these spaces, academics presented their research to initiate the discussion and prompt reflection (the practical approaches to seminars are also discussed in Chapter 5 Section 4.1). Therefore, within this framing of the relationship between research and a policy problem, the processes of knowledge exchange and research production were

separate. Instead, research was seen as produced first and shared and transformed later, through the interaction between different actors (and hence, was still autonomous from direct policy problems). This conceptualisation is closer to the traditional academic perspective – central to the logic of excellence (see: Section 2.3.2) on the boundary between science and politics (Jasanoff, 1987). By drawing a line between research production and application, some of the interviewees were therefore reinforcing their positioning as academics. Additionally, by separating the research from politics, academics were drawing a parallel between the form of engagement work they were doing and traditional research work. Even though this framing was employed more extensively by the Genomics Forum, some Fuse academics used it as well, particularly while discussing seminars and Quarterly Research Meetings (see: Chapter 1, Section 6.3). In these cases, the academics and decision-makers working with Fuse discussed sharing perspectives and bringing different voices together.

Research and policy close together

The second framing of the proximity between science and policy entailed a close policy engagement whereby both research questions and knowledge are produced along with policy and practice partners. As summarised by the interviewees:

> I think, one of the key working practices at Fuse that achieves that, is that everything we do is done in partnership with providers. Every Fuse activity, every Fuse theme group, every research meeting, it is always a combination of users, providers, academics and researchers, so that all perspectives are recognised and incorporated into our actions. (Fuse 6)

> and:

> So, there is a lot of success, and at the soft end of things, I think there's this culture, this community of stakeholders in public health, which involves members of the public, third sector, local government, NHS, academia, you know, these different groups. They have a network which allows them to exchange information to a degree that allows all sides to make more efficient use of each other. Because in a way, you could also argue that academia is a resource for health and social care, and if health and social care can make us be more efficient in supporting them, then both sides win. I think that's really the key idea. (Fuse 7)

Both the academics and the policymakers recognised that working in a co-produced manner increases the potential for research to be used in policymaking and assures the relevance of the problems to policymaking and practice:

> Where my collaborations with Fuse, I think, have felt best have been where we've been able to identify a problem collectively and then work with great focus on that. (Policymaker 7)

Despite an acknowledgement among the public health interviewees that co-production is the dominant model of the relationship between research and policy within their organisation, the definition of co-production itself, as provided by the interviewees, was sometimes quite blurry. Some interviewees used it interchangeably with "partnership", whereas others saw it as a part of "knowledge translation".

Nevertheless, the notion of "co-production", in the way it was discussed by a majority of Fuse academics, entailed an interaction between science and policy that would go into greater depth than just the notion of "translation". By contrast to the framing described in the preceding section, people engaged with Fuse saw their role as responding to policy needs and questions. For example:

> I think the key thing is that we are embedded within practice and policy, and that we develop research questions that respond to practice needs within a policy context so they can be realistic and there's a good chance they can be actually implemented. (Fuse 6)

The meaning of co-production discussed by Fuse members significantly differs from the idiom of co-production introduced by Jasanoff (2004) (see also: Chapter 1 section 1.3.) A useful mapping of this concept across different strands of literature was proposed by Lövbrand (2011, p. 226-227) who differentiated between co-production as an *analytical* idiom with its poststructuralist and critical approach to understanding mutually constitutive notions of knowledge and power from a more *normative* meaning of co-production. Co-production in this second vein is prescriptive and entails calls for opening up the process of knowledge production to various partners – whether on the grounds of cognitive justice or an increased relevance of research (Lövbrand, 2011, p. 227)

The meaning of "co-production" expressed by the vast majority of academics associated with Fuse was aligned with the normative understanding of the term and was based on the assumption that effective collaboration between science and policy requires a close coupling of practices and understandings – hence closer to the logic of impact. As such this model was inherently geared towards answering policy and practice questions, or co-producing the questions with policy and practice partners. As

a consequence, knowledge production and application were seen as consolidated in one process. Therefore, this approach to autonomy assumed an establishment of spaces (or projects) in which autonomy is not prioritised, but rather research is being co-produced collectively between different (academic and non-academic) actors. The question of autonomy, therefore, did not seem to be as central to academic work as the question of impartiality (which the academics were more reluctant to waive).

6.3. MULTIPLE FRAMINGS OF KNOWLEDGE EXCHANGE

The previous sections discussed various conceptualisations of autonomy (or lack thereof) and impartiality by the academics working in Fuse and the Genomics Forum. As argued, academics engaged in "conceptual stretching" of these terms (impartiality in particular) to adapt these central academic values (Merton, 1942) to the new institutional setting in which they were increasingly working with policymakers and practitioners (Jasanoff, 2005). These different rhetorical strategies were closely linked to the underlying assumptions regarding the process and outcomes of knowledge exchange. This section will in turn explicitly deal with the ways in which these different understandings of engagement were translated into specific framings of knowledge exchange and the desired impacts resulting from knowledge exchange. Put simply, the remaining part of this chapter will deal with the question: what do academics mean when they say "knowledge exchange"?

Conceptualising research impact and knowledge exchange was a difficult task, as the interviewees acknowledged a broad variety of ways in which research could potentially impact on policy and practice. The literature on knowledge utilisation concurs with these observations, highlighting the multiplicity of ways in which knowledge could influence policy (Weiss, 1979, 1980). The most common division in the literature on this topic, discussed in detail in Chapter 3 Section 3.4., focuses on two broad categories of impact: instrumental – meaning influence on decisions, actions, etc., and conceptual – meaning influence on awareness and understanding (Nutley et al., 2007). This categorisation – by outlining changes in understanding and changes in actions – implicitly differentiates between knowledge and practice as two separate areas on which research could impact.

The difference between knowledge and practice seems therefore to be crucial for understanding knowledge exchange outcomes. Nevertheless, such differentiation in a policy area is challenging, as policy is inherently a knowledge domain, in which different types of knowledge interact with each other (Freeman, 2007; Maybin, 2016). Arguably, no policy action is possible without knowledge. Some types of policy knowledge are even created explicitly through carrying out policy practice and are embodied in policy actors (Freeman & Sturdy, 2014). At the same time, the literature clearly differentiates between "knowing" and "doing" (Grundmann, 2017). And these two are not always connected; for example, empirical research on knowledge uptake shows that in many cases knowledge and awareness do not translate into policy decisions for political reasons (Boswell, 2008; Stevens, 2011).

Schön and Rein (1994) have dealt with the problem of differentiating between knowledge and action by categorising different forms of policy reflection with reference to their abstractness or closeness in relation to real-life problems. Schön and Rein (1994, p. xiii) listed the following levels: policy practices; policy itself (rules, law, prohibitions); the policy-making process; the particular positions and arguments; institutional action frames – the beliefs, values and perspectives; and meta-cultural frames – broadly shared values, beliefs, perspectives.

One of the most salient findings emerging from the data was that the vast majority of the interviewees saw the main role of knowledge exchange as attempting to influence policymakers' or practitioners' knowledge (rather than action). Nevertheless – and reflecting Schön and Rein's (1994) categorisation – even though the interviewees saw themselves as affecting knowledge, they differed in their conceptualisation of the level of abstraction of what they discussed when discussing "knowledge". In particular, the interviewees differed significantly in the way they understood the distance between the knowledge produced in interaction with policymakers and its potential for changes in action or the decision-making process.

The interviewees, when discussing the goals of their knowledge exchange work, depicted four different understandings of knowledge exchange (and related the outcomes as linked to these categorisations), which I illustrate in Figure 3 and discuss below: challenging policy framing, broader learning, providing actionable evidence, and advocating a specific policy option.

Figure 3. Framings of knowledge exchange.

The categorisation depicted in Figure 3 above pertains to the spectrum between conceptual and instrumental uses of research proposed by Nutley et al. (2007, p. 51; see Chapter 3 Section 3.4) The empirical data considered in this chapter suggest that the dichotomy between conceptual and instrumental research use not only entails a difference in the level of abstraction of produced knowledge (hence affecting either policy knowledge or action), but also points to different mechanisms for achieving these various forms of evidence use (Dunlop, 2014; Landry et al., 2001b). Even though different levels of abstraction of knowledge (and their conceptual closeness to instrumental or conceptual impact) are to a large degree fluid, the strategies aimed at achieving seem to be more rigid. Therefore, achieving conceptual and instrumental impacts would require different knowledge exchange strategies. These strategies will be discussed in detail in the following sections.

6.3.1. Challenging

In the first framing – and one oriented towards influencing the most abstract forms of knowledge – knowledge exchange was understood as challenging the policy frameworks. Some of the academics (across both organisations, but predominantly

from the Genomics Forum) perceived the goal of their organisation as to challenge the way policy problems are structured and understood. By this they meant changing how policymakers think about problems, or framing the policies in broader terms:

> I think it's that kind of often helping people who are engaged in a policy issue to think: "Well, actually how might we think about this", was often more useful than trying to say here is a problem and this is the solution. Thinking around framing questions, rethinking questions. (GF 3)

and:

> Because you're doing that kind of work, you can provide a kind of topographic map of a moral, or ethical, or policy, or medical, or whatever issue, that provides more depth, more dimension than most people have in mind. And all of a sudden, by throwing in that kind of depth and complexity, you can help people... Well, let's put it this way. You can offer them the chance to make better decisions. To make better policy. (GF 5)

According to this framing, the outcome of knowledge exchange activity should entail changes in what Schön and Rein (1994, p. 13) called "institutional action frames", which comprised values, beliefs and perspectives held by social actors within particular institutions. As such, the level of abstraction of this type of impact is higher than that of the particular policy decisions or regulation. And indeed, the interviewees who saw this type of research use as the main goal of their organisations, pointed out that their role was not to offer any concrete policy solutions. In that sense, the interviewees who understood knowledge exchange as challenging policy frameworks viewed the objective of their work to be analogous to what Smith (2013a) calls critical ideas. These are the ideas that do not have a normative element of desired reality (as is the case for example in advocacy, discussed in the following sections), but rather are focused on pointing out the problems with existing policies.

6.3.2. Learning

The second type of framing of knowledge exchange entailed broad learning (a review of different approaches to policy learning is presented in Chapter 3). The difference between learning and challenge (discussed in the previous section) is not always clear in the existing literature on evidence use. For example, Carol Weiss has described learning and challenging policy frames as aspects of enlightenment, without specifying how and whether they differ from each other (Weiss, 1977; Weiss, 1979).

The interviews with academics working for Fuse and the Genomics Forum offer insights into the difference between framing knowledge exchange in terms of "learning" and in terms of "challenging". The findings presented in this chapter suggest that these two types of knowledge exchange framings were similar in some respects. For example, both these framings conceived the engagement with policy and practice to be targeted mainly at changes in understanding of policy problems, rather than directly at policy practices or proposing concrete solutions. Therefore, both these framings perceived the objective of knowledge exchange mainly as influencing policymakers' knowledge (as indicated in Figure 3).

Nevertheless, "learning" and "challenging" as framings of knowledge exchange differed in some important aspects. The level of abstraction in the case of learning was lower than in the case of challenge, as learning outcomes referred to issues on the level of policy positions and understandings (in Schön and Rein's (1994) conceptualisation). Therefore, it involved a collective process of building an understanding, rather than just a challenge to a particular framing. At the same time, the outcome of knowledge exchange in this framing was not to be envisioned as a concrete, measurable change, but rather as a process of broader enlightenment (to borrow Weiss's (1977) term). For example, one of the interviewees described it in the following way:

> It's vital there should be tension at the outset. It's vital that there should be learning on all sides. I emphasize all. That's in bold letters, italicised, capitals, whatever…on all sides. It's a mutual education process. It's absolutely mutual, and that goes for all education. It's a learning process that involves an exchange, a partnership, if you like, of ways of thinking. If you enter into a process of information, knowledge, understanding exchange with a sense that there's no higher-up, that we're all equal, we're all listening and learning from one another, then inevitably in the end, you find a consensus. (GF 10)

The process of learning took place in a group setting and was based on an interaction of different views and experiences (akin to Wenger, 1998). The presence of different voices helped to contextualise and problematise policy problems:

> What I think we did do for the policymakers who did participate and who over time we developed relationships with was offer them the opportunity to think bigger and to meet a variety of people who were thinking about things in different ways. (GF 2)

Therefore, framing knowledge exchange in terms of broader learning entailed changes in knowledge and awareness which were produced as an effect of dialogue between multiple actors, viewpoints and experiences.

6.3.3. Providing actionable evidence

The third framing of knowledge exchange entailed creating research-based recommendations or alternatives, usually in a co-produced way. The interviewees employing this framing saw the aim of knowledge exchange as the production of evidence that policy and practice partners might use directly in their practices, as illustrated by the following quote:

> What sometimes practitioners need and want are actionable messages that have clear relevance and a clear set of implications for policy or practice, but that doesn't make them simplistic necessarily. […] I see lots of interesting stuff academics are involved in doing that policy and practice partners might see and say "Yeah? So what? What does that mean for me?" And there is something about the translation of an idea or a vision or a clear set of commitment to evidence informed practice being translated into workable practice and I think that's not a straightforward practice, but coming together as academics and researchers and policy and practice partners and service users is probably the best way to get as close as you can get to efficient and effective services or ways of delivering whatever it is you're delivering. (Fuse 5)

The academics who signed up to this interpretation often acknowledged that the policymakers and practitioners do not actually make decisions purely on the basis of technocratic rationality (reflecting much of the literature on evidence-based policymaking, see: Cairney, 2016; Parkhurst, 2017; Sanderson, 2009); thus they acknowledged that the final judgement on the decision lies with the policymakers who are guided by political and pragmatic considerations. This type of framing reflected a focus on involving the policymakers in the process of knowledge production and working in partnership in order to produce a result that could then be implemented in policymaking. Providing actionable evidence differed from learning in terms of its closeness to practice, in that it involved not only interacting with policymakers but also conceptualising possible conclusions to flow from the process:

> We would have these meetings and kind of see what issues they were all raising. Listen to them try and figure out some common ground again. So one of the things that I spent a lot of time doing was sort of

> trying to identify questions or topics that were of interest and value to lots of different communities. (GF 2)

However, it does not mean that this form of outcome was completely focused on one, desired form of policy change. Here, the academics highlighted the need to abstain from promoting only one policy option and discussed "implications" rather than "advocacy". For example:

> We do "what the evidence is saying". Whether we do recommendations... we might be inclined to capture it in terms of what are the lessons for policy or what might be the implications for policy, rather than recommendations. Recommendations might seem to be too precise or too general to use in a particular context. I think you'd be looking to say 'these are the possible impacts' that could happen if such and such were to occur in your area but it depends on the dynamics and the characteristics of your area. But that's what we would expect to see happen. So we try to tailor the evidence to the particular context. And that would be different in different places. And there might be a limit on generalisation in that regard. So the evidence-base will only take you so far. So we would be inclined to say: 'here are the pointers to think about, points to take on board, things to be aware of', rather than firm recommendations. (Fuse 1)

Therefore, although framing knowledge exchange as the provision of actionable evidence was less abstract and more concrete than framing it as learning (since in the former case the interviewees were trying to influence the policymaking process or concrete policy decisions), both framings viewed knowledge exchange as a process carried out in social settings, through collaborating with research users.

The difference between these two models therefore does not lie in their approach to engaging with the social setting, but rather in their perspective on the desirable outcome of knowledge exchange. The key difference here reflects Lövbrand's (2011) categorisation of different approaches to co-production into two types: the reflexive/critical model and the utilitarian model. The reflexive model is identified by the "ambition to expose and challenge dominant knowledge" (Lövbrand, 2011, p. 227). Therefore, this type of "reflexive learning" by policymakers (Dunlop, 2014) was oriented towards conceptual uses of knowledge. On the other hand, the utilitarian model sees the co-production in terms of effectiveness in producing useable knowledge as well as accountability of experts (Lövbrand, 2011). As such, it is aimed at supporting "epistemic learning" aimed at instrumental uses of knowledge (Dunlop, 2014). Therefore, the two framings differed in their perspective on the level of

abstraction of produced knowledge and consequently – various types of desirable impacts.

6.3.4. Advocating

The final framing of knowledge exchange viewed it as advocating for a concrete policy change. As indicated in Section 6.2, some of the Fuse academics highlighted a need to advocate (at least occasionally) for specific policy options, particularly in the cases of national-level policy concerning alcohol, tobacco or health inequalities. Here, the level of abstraction of the perceived outcome of knowledge exchange work was the lowest of all four framings and referred to concrete policies, including regulation, resource allocation, laws and prohibitions, etc. (Schön & Rein, 1994).

One consequence of working with concrete policy options is an inevitable politicisation, as the crystallised policy options narrow the scope for learning but support formulation of specific coalitions (Turnhout et al., 2008). As discussed in Section 6.2, the vast majority of academics working on knowledge exchange projects signed up to the notion of impartiality – either in terms of abstaining from taking a position in political debates or in terms of supporting evidence-based options. However, in the case of advocacy, the boundary between "evidence-based" and "political" propositions was not always unambiguous. The issue of the scale of political involvement seemed to create tensions both for the organisations and for the individuals within them, as they faced a choice between involvement and impartiality. For example, one of the interviewees explained their idea that Fuse should act as a "pressure group":

> Organisations lobby all the time, drinks industry, tobacco industry – they lobby, why shouldn't we lobby? Now some of my academic colleagues feel very uncomfortable about that; they say that's a political activity and we should stay out of politics and keep our independence and we only have credibility because we are independent and we're not political. So I think there's a big divide there about how political we should be. There're also some people who are nervous about being too politically outspoken when we rely upon national funding. So, I think we should but I think there are equally good reasons why we don't. (Fuse 9)

This quote illustrates the fact that the scale of political involvement (for example in terms of acting as a lobby group to the government) when advocating for specific policy solutions was problematic, even for academics who believed that at least some

scale of political involvement was acceptable in academic work. Even when the political involvement entailed advocating for evidence (rather than for policy options), the lines of acceptable (or non-political) involvement remained contested.

6.4. BETWEEN REPRESENTATION AND FACILITATION

The chapter thus far has discussed the rhetorical work of academics in adapting the concepts of impartiality or autonomy to the new setting of policy engagement. This was followed by a categorisation of different framings of knowledge exchange, guided by the perception of the desirable outcome of the activity. The spectrum of different understandings of the science-policy interface on the part of the academics is presented in Figure 3.

This diversity of framings represented in Figure 3 could be further analysed by approaching it from the central theme of this thesis: looking at the relationship between science and policy in terms of navigating autonomy from, and embeddedness, in the social and political contexts. One way of explaining the differences between various framings of knowledge exchange is by considering a contrast made in Carlisle's (2000) framework of academic advocacy, which differentiates between representational and facilitational advocacy. Representational advocacy aims to promote specific policy options whereas facilitational advocacy focuses on working with communities and the public. Smith and Stewart (2017b) point out that the dominant (although not the exclusive) understanding of advocacy, at least within public health, is the representational type.

Before applying this model to knowledge exchange, it should be noted that, even though the division between representation and facilitation seems to be relevant and conceptually fruitful to knowledge exchange practices, not all the stakeholders of knowledge exchange organisations (or in fact only a minority of them) could be described as grassroots communities. Some of them (e.g. decision-makers) have considerable power and it would be problematic to position them as a group that is in a need of advocacy on their behalf. Nevertheless, this distinction between facilitation and representation helps to capture an important dimension of the knowledge exchange work by acknowledging the extensive work conducted in dialogue and collaboration

with different non-academic groups but also work towards achieving specific evidence-based outcomes.

Consideration of the difference between facilitation and representation is crucial, as it helps to problematise not only the concept of knowledge exchange but also that of the multiple different roles academics play in policymaking. This section will approach this problem by proposing a framework in which framings of knowledge exchange identified in the data (and presented in Figure 3) are categorised across two dimensions: 1.) division between knowledge and practice, discussed in the preceding section; and 2.) approach regarding engagement with regards to focus on evidence or relationships. Therefore, the framework of different models of knowledge exchange, which I present in Table 7 and discuss below, categorises the four framings of knowledge exchange in accordance with their focus on facilitation (Learning, Providing actionable evidence) and representation (Challenging, Advocating). These framings are further categorised in terms of the perceived level of abstraction of the desired outcome discussed in the preceding section, thus differentiating between knowledge (Learning, Challenging) and action (Providing actionable evidence, Advocating). This additional dimension within this framework highlights the fact that different forms of knowledge exchange could be carried out at various levels of engagement with stakeholders. It thus further problematises the notion of conceptual and instrumental impacts by pointing out that some forms of impact do not (or even cannot) be achieved through a close collaboration with stakeholders, as they require at least some level of separation of science and policy (cf Sundqvist et al., 2017 and Chapter 1 Section 1.2.).

Table 7. Different models of knowledge exchange.

	Facilitation	**Representation**
Knowledge	Learning	Challenging
Action	Providing actionable evidence	Advocating

Challenging: According to this model, challenging the current policy setting is both representational (since it is concerned with a specific policy setting) and targeted at changes in knowledge and understanding.

Learning: In turn, learning was understood as a situation in which multiple participants with different backgrounds interact with each other and learn together about policy and practice problems. Therefore, it is facilitational and aimed at knowledge creation. It differs from challenging because it is broader in scope and is not focused on a singular learning/knowledge outcome (therefore it is not representational).

Providing actionable evidence: Similarly, the process of providing actionable evidence through production of policy-oriented research is based on collaboration between different groups of actors (for example in a format of co-produced research projects and evaluations), but it focuses more on recommending practical action that could be taken as a result of this form of engagement.

Advocating: Finally, advocacy work conducted by the knowledge exchange organisations was both representational and aimed at practice – as its objective was to promote specific policy options. This categorisation of models of knowledge exchange points to two main insights into engagement with non-academic audiences: regarding diversity of the forms of engagement, and regarding constructive and destructive levels of closeness between the policymakers/practitioners and academia.

The first insight that this model provides points to the fact that "engagement with stakeholders" (as a prescribed strategy to achieve research impact – see: Chapter 2 Section 2.5.2.) is not homogeneous but epistemologically complex and can be carried out at different levels of abstraction and drawing on various institutional logics. Both organisations – Fuse and the Genomics Forum – made claims about being close to stakeholders and involving a multiplicity of voices and viewpoints in the research and knowledge exchange process (Dunston et al., 2009; Heaton et al., 2015; Holmes et al., 2017). At the same time, their conceptualisation of the boundary between research and policy and the achieved impacts differed significantly, for example in terms of the perceived closeness to research questions and solutions, or in terms of the impact on knowledge or practice that they aimed for (as discussed in the preceding section).

Looking at two framings of knowledge exchange that are based on facilitation (therefore employing engagement with different actors: policymakers, practitioners, NGOs, policy advisers), namely learning, and providing actionable evidence, highlights a difference in the positioning of science and policy within knowledge exchange. In the learning model, science was seen as one of the voices in the debate, whereas in the producing actionable evidence model it was framed as an active participant in the policymaking process. This subtle difference would translate directly into the level of change that this framing was promoting (that is, as discussed above, knowledge versus practice). This characteristic was discussed by one of the international-level policymakers collaborating with the Genomics Forum:

> So, it's a question of translation. What does one mean by translation? And impact? So, translation and impact might be taking the outcomes of the research and disseminating them in a way that everyone around can understand. And, that is the... That was the way the Genomics Forum mainly worked. Not only, but mainly worked. So, there was a real dialogue. There was a real understanding of this as fantastic. Really, really interesting stuff. But, what it did less of […] was say, "Well, what does that mean directly for policy?" Or, "What does that mean directly for investment?" So, if you close the circle and come back into a set of potential users of these insights, because that set of potential users of these insights are still going, "Well, that's quite interesting but what does it mean for me?" (Policymaker 4)

As illustrated in the quote above, the conceptualisations of engagement with policy and practice audiences differed as regards the perception of "closing the circle". The difference between seeing knowledge exchange as learning or as producing actionable knowledge speaks to broader themes of the role of engagement in the changing institutional context of academia. Chapter 2 illustrated how one of the cornerstones of the logic of impact, as depicted in policy documents, is its focus on engagement with non-academic actors. Nevertheless, the empirical findings presented in this chapter problematise the notion of engagement, as illustrated by the ways in which academics – when faced with new institutionalised expectations of relevance – made sense of this expectation by engaging various discursive framings of autonomy, impartiality and knowledge exchange.

These two types of framings of knowledge exchange – learning and providing actionable evidence – even though conceptually close to each other, were drawing on different institutional logics. In the cases of providing actionable evidence, the

academics were highlighting the need to interpret the research results in terms of their direct applicability (hence – "closing the circle") in line with much of the work on research utilisation (e.g. see reviews by Oliver et al., 2014, Mitton et al., 2007). Accordingly, this form of knowledge exchange went beyond traditional academic work and was closer to what Grundman (2017) and Jasanoff (2011b) would categorised as policy expertise. As such, this activity was drawing on a logic of impact by engaging directly in problem-solving and positioning academics in close proximity to policymakers.

Learning, on the other hand, stayed in the realm of opening up the debate, as opposed to closing it down with solutions. By reclaiming the notion of autonomy through framing it as autonomy from policy problems (rather than from policy actors; as discussed in Section 6.2.2), and framing knowledge exchange activities as devoid of concrete solutions, the academics opened up a possibility of engaging with non-academic actors in ways that were aligned with the logic of excellence. Therefore, and to turn Grundmann's (2017) and Jasanoff's (2011b) argument around, by abstaining from mediation between science and policy (or "closing the circle"), the interviewees could engage in knowledge exchange and remain within the realm of academic work. Hence, they were distancing themselves from the institutional logic of impact while conducting work promoted within this logic.

The second insight emerging from the model presented in Table 7 has to do with the two less ubiquitous framings of knowledge exchange – challenge and advocacy, and is related to the issue of productive and destructive relationships with policymakers and practitioners. Both advocacy and challenge are inherently about changing the status quo (even though understood on different levels of abstraction). As argued by Schön and Rein (1994), some levels of political reflection cannot be carried out by actors directly involved in practice (e.g. policymakers) but require external actors. Schön and Rein (1994) considered mainly cognitive aspects of such reflection; however, as shown by the two case studies in this research, the ability to offer critique to policymakers is also institutionally determined (for example by the systems of incentives driven by different institutional logics).

Establishing close relationships with policymakers and practitioners might lead to a focus on consensus (van der Sluijs, van Est, & Riphagen, 2010). Some academics have

pointed out that a very close relationship with the policymakers might be problematic, particularly when the co-produced projects are sponsored by the policy and practice partners. Such a consensus-driven context poses a challenge to the research process, as the academics might feel a need to censor themselves in order to meet what they might perceive as policymakers' expectations of them (discussed also by Innvaer et al., 2002; Smith, 2010). Therefore, navigating between factors that increase the chance of research being used and factors that ensure the possibility of critical intellectual work requires a delicate balance to be maintained. Some academics pointed out that the relationship with the policymakers was too close for a critical engagement with more complex political policy problems, therefore highlighting a conflict between forms of engagement based on facilitation and representation. For example:

> I do stuff that's much more policy facing at a national level […]. Perhaps more critical and, you know, I don't run [these types of projects] at Fuse. [...] And, the way I see how Fuse operates, particularly the colleagues that are in Fuse, is that it is very, much more locally oriented. […] And, sometimes, not necessarily very critical. And, sometimes, rather too close to practitioners. And not able to necessarily take a step back, partly because of how the funding works. (Fuse 10)

At the same time, some academics claimed that, at times, a close relationship with policymakers might be necessary for representational forms of knowledge exchange. For example, a few interviewees pointed out that, actually, a close relationship with policymakers might enable critical work, because the trust built over time would allow bolder statements to be made (e.g. when it came to challenging or advocating). This was the case for both organisations and at both the local and the national levels (although some interviewees pointed out that it is more difficult to sustain this level of closeness on a national level). Additionally, the critical relationship was shaped by the rank of the policymakers. Senior policymakers were perceived as a more desirable audience for critical engagement:

> I think managing relationships is a really important part of the role. That's not easy to do. Some of those discussions are very sensitive. Knowing when to say, what to say, how to say it. They're not always easy discussions. When I was reading back the findings from the evaluation I was quite careful to tailor the messages that I was giving to the people I was speaking to. At very senior levels some of those messages were quite hard-hitting, I think. They were wider implications for the council, but I think when I was talking to staff, I tried to take a

> much more....acknowledging their good work actually, as well as giving them some constructive feedback about things that people had talked about where there was room for improvement. (Fuse 5)

Some of the interviewees felt that closeness to policymakers allowed them to be up-to-date with the field and therefore offer better insights into the directions in which the system should evolve. Consequently, this closeness supported their critical engagement with policy. Overall, the presented model suggests that the moves towards closer engagement between academics and policymakers, as well as expectations placed on academics to achieve research impact, have resulted in the emergence of multiple framings of knowledge exchange, involving different configurations between science and policy.

6.5. KNOWLEDGE EXCHANGE AND ACADEMIC IDENTITIES

The issue of autonomy discussed in the previous section not only required a sense-making process of conceptualising what knowledge exchange means and how to practise it (discussed in the previous chapter), but also posed a challenge to the academic identities of the researchers involved in the knowledge exchange-oriented organisations. One reason why moves towards research impact and knowledge exchange undoubtedly affect academic identities is that the concept of autonomy is central to this group's identity (Clegg, 2008; Henkel, 2005).

Academic identities are often presented as a spectrum ranging from the "ivory tower" academic to the more immersed, engaged figure of the entrepreneur or advocate (Lam, 2010; Pielke, 2007; Smith, 2012). The majority of academics, undoubtedly partly as a result of changing institutional setting, develop progressively hybrid academic identities placing them somewhere on this scale (Lam, 2010). That was certainly the case for Fuse and the Genomics Forum. The majority of interviewed academics – in keeping with Lam's (2010) study on academic entrepreneurship – reported diverse forms of hybridity of the academic identities. At the same time, what is less explored in the literature is the way people in liminal spaces react to institutional changes by adjusting their identities to fit the new setting.

The fact that working with a knowledge exchange organisations was challenging to academic identities is illustrated by one of the academics involved in the very early stages of the Genomics Forum (in 2005), who reflected on their reasons for leaving the organisation:

> I left because I didn't think I was... I wasn't being treated like a researcher, and I didn't feel like a researcher, and so I left. (GF 13)

While other researchers did not report experiencing quite such a strong identity crisis, almost all of the interviewees reported employing some form of non-traditional academic identity, adapting to the new environment by combining elements of traditional academia with engagement with non-academic audiences. The following sections will discuss three strategies employed by academics working in knowledge exchange organisations, which were aimed at easing the perceived challenge to their identities: othering, joining up, and non-conforming.

6.5.1. Othering

The first strategy – othering – involved reinforcing one's identity by disassociating oneself from an abstract group of "traditional" academics. It appeared to be aimed at separation from the academic model that would not incentivise knowledge exchange work, instead adopting a position as the new version of an academic. For example:

> If I look like a traditional academic, I don't feel like one. I don't feel like an academic who's primarily sat in a university with the doors closed [...]. A lot of work that I do is naturally about engaging with people in different health and social settings. It feels like such a natural part of my work, in the way that I work, that it's hard to put a figure on it. It's a really hard question to ask. (Fuse 15)

and:

> I'm not sure what a regular academic life is as I don't think I've been one of those. I have only ever done research which I feel has the potential to impact in positive ways on practice. (Fuse 14)

This approach was often complemented by two sets of factors. Firstly, it was coupled with the perception of the science-policy boundary as malleable and in need of blurring (which will be discussed in detail in Chapter 7). Secondly, academics employing this identity strategy often had a strong normative outlook on knowledge exchange as something academics *should* be doing, almost as a professional duty.

6.5.2. Aligning

For some academics, the institutional changes and the possibility of a threat to what could be seen as the core of academic identity (intellectual work, autonomy) resulted in efforts to strengthen their traditional academic identity (Swan et al., 2010). These academics framed knowledge exchange as a type of academic work and therefore aligned themselves with traditional academia:

> I think being embedded in academic research, I think absolutely crucial, that we were all not just taking an overview of research but were genuine intermediaries. We're all academics who really understood the approach that was being taken to genomics, the kind of research that was being done and had a reasonable sense of what the policy issues were and then reasonable links to policy people. (GF 3)

This group of interviewees positioned themselves on one side of the boundary, the academic one, thus strengthening the division between policy and research.

6.5.3. Non-conforming

Finally, the last (and rather small) group of academics took a non-conformist stand. This form of justification consisted of ignoring the academic-policy/practice boundary completely. The practices of academics adopting this identity strategy would include ignoring the tensions. For example, a few of the Fuse members claimed that they did not care about their careers or career risks stemming from doing too much policy and practice facing work.

Another non-conforming strategy was to embrace the hybridity of the role and not conform to either side of the boundary. As one interviewee described a colleague:

> She, as far as I understand it, was always undecided whether she wanted an academic, or a policy, career. She had come from a background where she'd done some advising in [policy], and so on. So, I think our aim was to appoint somebody who maybe saw themselves as having a hybrid identity, and allowing them to develop that hybrid identity through that work. (GF 4)

Two of the interviewees who employed this balanced hybridity had previously worked in advising or consulting positions (in addition to academia). However, this form of hybridity did not appear to be sustainable in the long term, and both interviewees eventually retreated back to academic positions.

The strategies discussed in this section point to the fact that the cultural and institutional change in academia – resulting from a new institutional logic – has posed a challenge to the academic identity (Henkel, 2005; Winter, 2009). This changing institutional environments lead to a development of identity-related coping mechanisms to deal with the challenges (Lok, 2010; Thornton et al., 2012). Therefore, academic identities, even though challenged by the moves towards impact and relevance of science, are not static but rather could be considerably re-framed (cf. van Hulst & Yanow, 2016).

6.6. CONCLUSIONS

This chapter has explored different frames used to make sense of the science-policy interface by the academics involved in knowledge exchange projects. These frames resulted from a sense-making process within organisations and rhetorical strategies for adapting traditionally academic concepts such as autonomy or impartiality to a new setting. This chapter has argued that there is an epistemological diversity of meanings and understandings of research impact and knowledge exchange work. In particular, these meanings differ across three dimensions: the attitude towards the impartiality of the researcher, the perception of closeness or distance between science and policy, and finally the level of abstractness of the desired outcome of the knowledge exchange activity. Consideration of these three issues helped to classify knowledge exchange activities into four categories, based on their closeness to knowledge or practice and on representation or facilitation as the main mechanism by which they were achieved. These four categories are: advocating (representational, aimed at practice), providing actionable evidence (facilitational, aimed at practice), learning (facilitational, aimed at knowledge), and challenging (representational, aimed at knowledge).

The discussion presented in this chapter highlights the complexity of the change in academic culture produced by the impact agenda. The interviewed academics were involved in a negotiation over the meaning of academic work, as they faced pressure to change so as to be more “usable”. Consequently, they adopted rhetorical strategies aimed at stretching the concepts of autonomy and impartiality to better fit this new academic reality without necessarily renouncing these values as part of their work. Similarly, the meanings of knowledge exchange were shaped in order to fit different

actors' values and objectives, but also their local understandings of what the core of academic work is (for example by employing meanings focused more on "reflections": Lövbrand, 2011) and therefore abstaining from engagement with the process of mediation between science and the practical setting (Grundmann, 2017; Jasanoff, 2011b). Hence, this chapter has shown impartiality and autonomy to be malleable concepts which could be strategically adapted to fit the changing institutional settings, without losing their authoritative core.

This process of stretching the meaning of autonomy or impartiality, as well as developing the understanding of knowledge exchange by negotiating the notions of academic and expert work, was not unbounded. Instead it was shaped by the existing institutional logics. Thus, this chapter is an illustration of the deep embeddedness of the process of sense-making (Weick, 1995) within the existing institutional processes (Weber & Glynn, 2006). The development of frames and identities was – implicitly or explicitly – shaped by the institutionalised notions of autonomy, impartiality and engagement, and in particular the contradictory framings of these concepts within the logic of impact and the logic of excellence. Hence, the process of making sense of knowledge exchange was both restricted and enabled by the institutional context (Weber & Glynn, 2006). Here, the institutional logics (via their symbolic structure discussed in Chapter 2 Section 2.5) on the one hand limited the scope of available meanings by placing impartiality and autonomy at the centre of academic work, but on the other hand, enabled creations of meanings by expanding the notions of engagement or co-production. Therefore, an important aspect of the sense-making process discussed in this chapter was its simultaneous establishment of the boundaries of potential limits while enabling meaning-making within these limits.

CHAPTER 7

‘IT’S MARRYING EVIDENCE WITH POLITICS’– KNOWLEDGE EXCHANGE AND BOUNDARIES BETWEEN SCIENCE AND POLICY

7.1. INTRODUCTION

The overall aim of this thesis, as set out in the introduction, was to explore the changing relationship between science and policy through a conceptual lens of two models: assuming separation of science and policy, and assuming integration of these two realms. The previous two empirical chapters dealt with this issue from different analytical standpoints. Thus far, Chapter 5 has explored the set of practices developed by the academics in Fuse and the Genomics Forum, and Chapter 6 has discussed the framings of research-into-policy work employed by academics involved in the knowledge exchange organisations. As argued time and again throughout this thesis, the basic assumption behind the impact agenda (for review see: Chapter 2) is that increased engagement between policymakers and academics will lead to a “research impact”. Even though this assumption is not untrue (Choi, 2005; Oliver et al., 2014), increasing engagement between academics and policymakers is widely regarded as complex, with far-reaching consequences, going beyond the instrumental uptake of research in policymaking. In this chapter, I aim to shed light on the consequences, for both policy and science, of this move towards increased interaction between the two groups.

In order to do so I will return to and expand on the concept of boundaries and boundary work discussed in Chapter 3 Section 3.5.1. As previously summarised, boundaries are not just rhetorical structures (Gieryn, 1983) but are also institutional and material (Bijker et al., 2009); therefore, they are important for addressing the multiple different aspects of knowledge exchange discussed thus far in this thesis, including framings of the work or the legitimacy of different practices. Boundaries are central to understanding the paradoxical position of academics in policymaking (Jasanoff, 1987).

Academics are valued because they are impartial and autonomous, but at the same time, in order to be "useful", they have to get involved in the politics of the process of governing. This chapter will explore in depth the delicate balance between setting and blurring boundaries and the roles these two processes play in evidence-based policymaking. By doing so, this final empirical chapter will reflect on the boundary navigation issues raised by the interviewees in the context of the existing debates over boundaries in the literature; hence, it will link empirical findings with the literature review presented in Chapter 3.

The chapter will begin by exploring the multiplicity of different boundaries between science and policy. I will argue that there is no one science-policy boundary, but rather a multiplicity of both inter- and intra-professional boundaries (Currie et al., 2014; Kislov, 2014; Martin et al., 2011). These boundaries are not equal in terms of their importance to the uptake of research in policy and practice, and – consequently – not all of the boundaries have to be blurred in order to achieve research impact. I will then explore research impact as a boundary phenomenon by focusing on changes in the boundary work of knowledge exchange organisations (going beyond instrumental, conceptual and capacity building impacts).

7.2. WORKING ON THE BOUNDARY

Boundaries between different groups are inevitable, as practices are historical and cultural phenomena, delineated by competences, expertise, learning styles, etc. (Abbott, 1995; Abbott, 1988; Wenger, 1998). The effect of boundaries on knowledge sharing is equivocal as they enable meaning creation and learning (Star & Griesemer, 1989; Kislov, 2014; Wenger, 1998) while also acting as barriers to learning (Akkerman & Bakker, 2011; Carlile, 2002). Understanding the boundary dynamic is particularly important in multi-professional knowledge exchange organisations such as Fuse and the Genomics Forum because, as highlighted by Dopson and Fitzgerald (2005), evidence tends to "stick to professional boundaries". Therefore, even if some of the organisations or professional groups comply with the need for evidence-based policy and practice, this does not necessarily mean that evidence produced or translated in one setting will travel across the boundaries to be implemented in another context.

In fact, studies of cross-boundary initiatives between research and policy and practice have highlighted challenges related to both organisational (e.g. in terms of structures or organisational priorities), and epistemic boundaries (e.g. in terms of understandings of evidence or ways of knowing) (Kislov, 2014; G. Martin et al., 2011; Smith & Joyce, 2012). Therefore, it was not surprising that the interviewees – both academics and policymakers – were quite adamant about the multiplicity of problems involved in working across institutional and organisational boundaries. For instance:

> Different institutions have got different cultures, different ways of working. There's a real difference, I think, between clinical research and public health research. I don't think that the public health arena is strongly understood in the National Health Service, who's obviously got clinical researchers. So, you've got professional differences. You've got organisational and cultural differences on both sides of the fence. You've also got the tensions between nationally determined priorities and the way that priorities are required at the local level, or regional level, which may not be the same. So, you've got, also, multi-professional engagement now because of a need to work across boundaries to more effectively deliver. (Fuse, NGO partner)

As pointed out in the quote above, knowledge exchange organisations have to work across *both* organisational and epistemological boundaries. The following sections will explore these boundaries and their significance for knowledge exchange in more detail.

7.2.1 Organisational/institutional boundaries

Inter-institutional boundaries

The interviewees from both Fuse and the Genomics Forum discussed a multiplicity of different organisational and institutional boundaries between science and policy, such as different priorities, budgetary constraints and the structure of institutions. However, a barrier that was most often discussed by both academics and policymakers was one of different timescales between science and policy worlds. The most common framing of this problem in the existing literature is that of irreconcilable difference between time-consuming academic research (due to research ethics, data analysis, broad scope of studies, etc.) and short timelines for decision-making in policy (Martin et al., 2011; see also Chapter 5 Section 5.2.). This framing of the problem was also present in the interviews with academics working on research impact. At the same time, the focus on these two particular knowledge exchange organisations, which were active over a

longer period, unveiled other dimensions of this problem. Interviewees often used "time" as a proxy for different organisational and administrative problems stemming from the collaboration between science and policy. First of all, it indicated a vulnerability of the knowledge exchange process to organisational changes on either side of the boundary. As described by one of the academics:

> In academic terms, ten years is not a lot of time. It's a very quick period of time. In local policy terms, if you just look back at the last ten years, one revolution after the other, nothing stays the same, everything is transiting, and some of the funny, I think, little observations about the interface between academia, which essentially hasn't changed in the last 10-15 years, and public health, which is essentially changing every two years, completely. So, we need to accommodate the volatility of change in our partners. (Fuse 8)

Another interviewee pointed out that, by the time larger research programmes are concluded and might provide the policymakers with the requested answers, the person asking the questions is no longer there, due to personal or organisational reshuffling (akin to the findings of Smith, 2013a). Therefore, the issue with time not only relates to actual timeliness of the results (which was also highlighted by the interviewees) but might also relate to the discrepant pace of organisational changes in academia and policy/practice respectively. The problem of "timeliness" of research might in fact refer to an issue of lack of continuity of policy structures and personnel, and to the structural incompatibility of research and academia (Maybin, 2016).

Secondly, interviewees discussing differences in timescales between research and policy were often using it as a proxy for issues with politically-driven, rather than evidence-based, policymaking. The expectation to produce research over a short period of time (see: Chapter 5 Sections 5.2 and 5.4) was seen as problematic for many of the academics, who felt that these timelines were not compatible with the ideas and values inherent in evidence-based policymaking. As described by one of the interviewees:

> In spite of best efforts to plan ahead what they're [research users] going to do in the next year, two years, sometimes they're asked to do something on the spot, and then they phone us up and say, "Can you give us anything in the next 48 hours that will help us to inform that?" So, it requires quick thinking, in a sense, that not everybody is comfortable [with], or is possible. And that's part of the policy process, the very volatile, changeable... (Fuse 3)

Such short windows might suggest that the evidence is required to justify the decisions or slightly change the course of action (as opposed to formulating the decision based on evidence). Therefore, short timelines were perceived by academics as indicative that the research would be used in a political or symbolic way (Weiss, 1979; Boswell, 2009). Many of the academics were not comfortable with this type of use of their research and perceived the short timeline between research and decision as indicative of policymakers using research to merely substantiate decisions already made.

These particular problems with short timelines point to the issue with decision-making in the increasingly complex systems of networked government. For example, in Weiss's (1995; see also Smith, 2013a) seminal work, people employed in policy organisations did not identify themselves as "decision-makers", because they felt that the actual decisions were made elsewhere. And, as was the case for the policymakers and practitioners interviewed for this study, sometimes the decisions were being made on a national or international level or across different policymaking entities (e.g. local authorities or different government departments) and the policymakers and practitioners had to present the most feasible and compelling proposals that were possible in the short time available. Therefore, the issue with timeliness of evidence is determined by governance systems of what Bevir and Rhodes (2003) called "plural polity" – a networked system in which power is distributed across multiple levels of governance (Newman, 2011). Different entities within this system have different institutionalised understanding of evidence, as well as different levels of power to make decisions (Oliver et al., 2012). Therefore, due to the organisational structure of decision-making interdependencies between multiple organisational entities, the evidence was often used to substantiate claims (Boswell, 2008).

Intra-institutional boundaries

The organisational and institutional setting was a barrier to effective knowledge exchange not only in terms of inter-institutional boundaries between science and policy/practice, but also in terms of the intra-institutional setting of academia (Currie et al., 2014). The vast majority of academics who took part in this study named the university structures as barriers to effective knowledge exchange, both in terms of cultural differences –

> The barriers are, I suppose the universities, thinking traditionally about what constitutes success for academics, which is not the only measure of success and not one that people in local government and policy and practice would recognise as being sufficient. Overcoming that barrier and trying to make impact much more important and much more about an issue, something that we need to work-out all the time. (Fuse 1)

– and of procedural difficulties:

> The limitation is not a limitation of Fuse so much as [a limitation of a] university setting, which is not very flexible when it's coming to thinking about policy or into questions which have a different timeline to start and complete, which a university is generally not well-suited to dealing with. Universities are a little bit slow when it comes to addressing research questions. It takes a little bit of time to go through the process of setting up the contract, setting up collaboration, and that time might be too long. (Fuse 7)

As both Fuse and the Genomics Forum (as a part of the Genomics Network) were multi-university structures, this boundary presented an important challenge to be overcome. Interestingly, many of the interviewees perceived managing the boundary between different universities as more challenging than managing the boundary between science and policy. They pointed out that the universities traditionally operate within a model of competition rather than of collaboration with other universities. This was particularly challenging in the case of the Genomics Forum (and the broader Genomics Network). The interviewees discussed multiple sources of competition between different centres within the Genomics Network (Innogen, Egenis and Cesagen) including a struggle over boundaries surrounding different fields of expertise or competing for resources. The latter situation was seen by the interviewees as having been exacerbated when the ESRC announced that one of the centres might not be supported in the second phase of funding, thereby placing the centres within the Genomics Network in "a competition mode" (GF 8).

The issue of collaboration and competition in academia was viewed as a less damaging (but nonetheless labour-intensive) problem for Fuse, where the initial organisational set-up was aimed more significantly at collaboration between the universities. The implications of this setting went beyond academic structures and affected the process of knowledge exchange itself, since, according to almost all of the interviewed Fuse's research users, the collaboration between the universities was perceived by those

working within it to be one of the centre's biggest advantages, a process seen as broadening and simplifying access to academic research.

7.2.2. Epistemological boundaries

Inter-institutional boundaries

The second type of boundaries – epistemological ones – were not entirely aligned with the organisational boundaries (similarly to Kislov, 2014). This outlook challenges the "two-communities" models (discussed in detail in Chapter 3), according to which academics and policymakers are members of different communities, with different languages and practices. The findings presented in this chapter point to a much more complex setting, one in which the boundaries are multiple and do not always align with simple professional divisions. This does not mean that there are no differences between academics and policymakers, but rather indicates a more complex picture of differences and similarities between the two groups. In some ways, academics and policymakers and practitioners were often not so different from one another (e.g. in terms of educational backgrounds and some shared discourses). For example, many of the interviewees acknowledged that the differences between academics and policymakers/practitioners did not stem from differences in abilities or levels of understanding (akin to Smith & Katikireddi, 2013; Wehrens, 2014):

> We're not completely clueless in practice about evaluation, it's just that we don't necessarily have the time […], but you know, most of us have got degrees…Well, a lot of us have got postgrads, masters and whatever. We've got people with PhDs working in public health as well. So, it isn't that we're bereft of those skills. (Practitioner 3)

and

> Because [knowledge translation] is not a case of dumbing it down by any means, it's a case of choosing what you present and tailoring what you present... that is of importance to those audiences. It is not as [if] outsiders don't know what social science mean, it's not as if... that's what I mean, that person who is sitting on HFEA has a first class honours degree in, you know, PPE from Oxford. They know what you mean when you talk about discourse, when you talk about representation, when you talk about you know, social construction of knowledge. (GF 1)

Therefore, as highlighted in the quotes above, both academics and policymakers usually had the necessary knowledge and skills to understand each other. The

epistemological differences between science and policy did not stem from differences in knowledge of the topic but rather from the *ways of knowing* across these groups (Cook & Brown, 1999; Feldman et al., 2006). This points back to the issues of hierarchies of evidence and differences in understanding of evidence, which were discussed in detail in Chapter 3 Section 3.2.1 and Chapter 5 Section 5.2. Academics and policymakers had different expectations regarding the nature of policy knowledge; for example, its generalisability, relevance and rigour. Consequently, they operated under contradictory assumptions about the level of certainty of knowledge necessary to make decisions.

Intra-institutional boundaries

Epistemological boundaries not only occurred between science and policy/practice; rather, they also encapsulated the differences *within* science. The intertwined epistemologies in this setting were exemplified by the varied approaches to understanding complexity. Different actors collaborating with Fuse and the Genomics Forum had diverse perceptions of the complexity of the policy setting, as well as diverse ideas (or lack thereof) for ordering this complexity. Here, the policymakers saw the reality as epistemologically complex, with multiple types of knowledge, values and objectives coexisting (see also: Freeman, 2007; Newman, 2011). The academics, however, were not uniform in their perception of and approach to complexity, but rather were divided across disciplinary lines – particularly those between social scientists and natural and medical scientists.

Natural and medical scientists were perceived to be struggling (at least initially) to comprehend and deal with the epistemological complexity of policy. For example, one of the epidemiologists admitted:

> I think I admire him [public policy researcher] because he's trying to grab something that evaporates as soon as you try and get of hold of. I prefer to deal with very hard, tangible things, policy, the sort of things that happen. And you'll see how it happen and realise it or understand. (Fuse 16)

On the other hand, the social scientists were perceived as being more accustomed to dealing with such epistemological complexity. A few policymakers acknowledged that the social scientists had a better understanding than the natural and medical scientists of the political realities of policymaking. This difference between social and

natural/medical scientists was partly due to different expectations regarding the certainty of knowledge to be produced and used, as well as to the epistemological diversity central to policymaking and practice.

This capability to deal with complexity has become an asset for social scientists once they are in a cross-boundary collaboration, as it gives them the ability to engage in a meaningful way with other epistemic cultures; for example, those of different sectors of government and of practice. For example, this capability was discussed by a policy adviser in the Department for Environment, Food & Rural Affairs (DEFRA):

> That's why social scientists interested me because they were better at putting it across. Even when they might not be understanding it in depth, they could grab some stuff from the natural scientist and they could package it up and they could put it across in quite a skilful way – more like a policymaker would. So I thought – yes, there's a place for social scientists in this. But then they have difficulties as well, because social scientists and natural scientists didn't want to talk to each other [...] I have noticed they talk in different languages a lot of the time. And maybe I was a bit in the middle of that sometimes. (Policy adviser)

The quote above highlights how differences between academic disciplines were more pronounced than those between academics and policymakers (a similar finding was presented in Bartley, 1992). As clearly expressed by the interviewee quoted above, policymakers and social scientists sometimes understood each other better than social scientists and natural scientists understood each other.

These differences between social and natural/medical science were highlighted when they were faced with working in a collaborative, multi-disciplinary and multi-stakeholder way, as in the two knowledge exchange organisations. As highlighted in the quote below:

> I still think that the behaviours and the skills needed to do things differently, were not there at the beginning. I don't think people realised what was involved in doing research differently, in a co-produced way, where the questions might emerge with the interactions with the practitioners and policy people, rather than having them pre-defined, whereby you are working in a very messy, complex environment, which is constantly changing. I don't think all of our academics were prepared for that. More used to it now, I suspect. But less so then. Particularly if they come from epidemiological, biomedical tradition. I don't think they felt comfortable with that agenda. (Fuse 1)

Working across different boundaries, in collaboration with policymakers and practitioners, was challenging for natural and medical scientists but also for social scientists, as they had to develop new roles – such as the role of mediators between the complexity of policymaking and epistemologically ordered biomedical knowledge. For example, one of the social scientists working with Fuse reflected on the educational role of social scientists within translational teams:

> I think originally although there was a lot of rhetoric around the translational research agenda, I think there were a lot of traditional public health people. By which I mean people who were epidemiologists and such like. Came from a medical training background. Who really didn't get it. They liked the idea but they didn't really understand what it would look like in practice, and so I think those of us who felt we were perhaps already in that place, and came from a more social science background, felt we had a lot of educating to do to make them understand what that really meant. (Fuse 11)

Therefore, as discussed in this section, the epistemological boundaries are not always aligned with organisational ones, as the disciplinary differences seemed to be more impervious than the institutional ones (Bartley, 1992). At the same time, the collaborative setting has opened up opportunities to rearrange these organisational and epistemological structures and created links which would at times render these differences permeable. These strategies are discussed in the following section, particularly in terms of establishing hybrid practices between people on different sides of the boundaries, such as rapid responders or embedded researchers.

7.3. KNOWLEDGE EXCHANGE AS BOUNDARY MANAGEMENT

The preceding section has argued that knowledge exchange organisations were located in a complex ecology, fragmented by a multiplicity of different boundaries, rather than divided by one science–policy boundary (Currie et al., 2014; Lamont& Molnár, 2002). These intertwined systems of multiple boundaries were not static but dynamic. Consequently, not all boundaries shared the same importance at all times. This has led to multiple groupings and re-groupings of different actors across different organisational and epistemological boundaries.

At the same time, not all of the boundaries were equally pronounced in practice. In reality, the key differences shaping the approaches to knowledge exchange were still

differences in practice; hence the key boundary was that between science and policy, establishing the division of labour between academics and policymakers (Huitema & Turnhout, 2009). The existing literature on research-into-policy processes is predominantly preoccupied with the inter-organisational boundaries between science and policy (with some notable examples: Bartley, 1992; Currie & White, 2012; Kislov, 2014; Martin et al., 2011). And there is a good reason for this focus – as this boundary would arguably have the most significant influence on the uptake (or lack thereof) of research in policy. For example, both Fuse and the Genomics Forum were not just managing boundaries but were doing so with a specific goal in mind – to achieve, in various ways, a level of change in the practices or understandings of actors on the other side of the boundary.

As discussed throughout this thesis, one of the consequences of the impact agenda was the development of the hybridity of academic roles, which became simultaneously academically and policy/practice oriented. As a result, academics had to develop new sets of practices ranging from producing traditional research, through translating research to producing policy research (see: Chapter 6). In this section, I will explore the continuity of these practices across institutional boundaries, examining how academics associated with Fuse and the Genomics Forum managed the science-policy boundary.

7.3.2. Maintaining and crossing boundaries

The predominant view on managing the boundary between science and policy is one of boundary blurring, since it has been acknowledged that this is an effective way of achieving useful and evidence-informed outcomes in policy (Guston, 2000; Guston, 2001; Jasanoff, 1990). Nevertheless, some scholars (Bijker et al., 2009; Halffman & Hoppe, 2004) argue that in reality, effective boundary work involves both division and coordination. Fuse and the Genomics Forum employed both strategies but to different degrees. Division and coordination of boundaries each played a different strategic role in knowledge exchange, which I will discuss in more detail below.

Boundary blurring

The boundary blurring approach to boundary work was represented by many of the interviewed academics and policymakers/practitioners who approached knowledge

exchange from the standpoint of identifying barriers to evidence use and then trying to ameliorate them (reflecting much of the literature on this topic, e.g. Oliver et al. 2014). For example:

> So, for me, there's two parts. How do we do the knowledge transfer of research into practice quickly, including use of findings, but equally how we use practice to inform research and I think that's the bit that, perhaps, academia is less… [is] weak on because often it's interested individuals in academia who have a very clear research history or career that they want to focus on rather than necessarily what's relevant to practice. And that sometimes... There's a dichotomy with that. (Policymaker 6)

Therefore, an important element of boundary blurring was recognising different organisational and epistemological barriers between academics and policy/practice in this particular setting and then developing cross-boundary practices that would be acceptable to both sides. Examples include developing shared research questions or understandings of evidence (epistemological boundaries); but also offering different forms of review to shorten timelines, embedding researchers in policy/practice departments, and hosting policy/practice partners at the universities (organisational boundaries). This process was particularly central to Fuse's strategy, which involved working with policymakers in developing an approach to their work. However, elements of this strategy were also present in the Genomics Forum, for example in health-related projects such as the work with the Human Genetics Commission (discussed in Chapter 5 Section 5.2.1).

Assuring continuity of knowledge exchange practices across the two sides of the boundary required the creation of a shared space where new, hybrid practices and shared meanings could be developed (see also Akkerman & Bakker, 2011; Guston, 2001). One example of such hybrid space was AskFuse[32] (see Chapter 5 Section 5.4.2), which streamlined and institutionalised these interactions. The development of shared practices was described by the interviewees as occurring in two conceptual stages. The first stage involved a series of discussions between a knowledge broker and decision-makers during which the group would work on establishing the goals of collaboration, turning policy questions into research questions, and planning the collaboration. This process entailed what Bechky (2003) describes as establishing a common ground, a

[32] See: http://www.fuse.ac.uk/askfuse/ [accessed: 28.08.2018]

necessary part of developing shared practices. This process aims to blur both epistemological (agreeing on a research questions, methods, outcomes) and organisational (timelines, method of delivery) boundaries. The second stage would involve producing research for policy and practice by researchers chosen from a larger pool of expertise, delivering interim and final reports to partners, and – often – disseminating the results together to broader audiences, for example in a form of co-authored papers or seminars.

Some projects within the Genomics Forum (most notably the one on Plant Genomics; see also Chapter 1 Section 1.4.2.) also achieved boundary blurring by structuring the process and implementing a co-production approach to planning the meetings. For example, the series of meetings was designed in consultation with practitioners, implementing their input into what the current challenges in plant genomics were. Furthermore, each meeting was preceded and followed up by briefing papers and summary reports, opening up an opportunity for feedback and reflection by the participants. Another method entailed, as a part of the Bright Ideas Fellowships, visits by fellows from the policy world who spent some time hosted by the Forum and thus had a chance to interact with academics and test their ideas or discuss the problems from different disciplinary perspectives.

Boundary setting

A second boundary management strategy is that of establishing boundaries, rather than blurring them. Even though the majority of literature focuses on boundary blurring as a strategy supporting science-policy collaboration, knowledge exchange organisations were not only blurring boundaries but also strategically setting them up. This was predominantly the case in areas of knowledge newly entering policy consideration. For example, one of the Genomics Forum's strategies was to establish social science as a legitimate voice in genomics science and technology, areas which do not necessarily have a strong social science presence. In order to expand the consideration of different genomics-related topics to include reflection on the social consequences of new technologies, the academics working in the Genomics Forum had to first establish social science as a field of knowledge having important contributions to make to the genomics debate. For example, as illustrated by the following quote:

> That's an area where there are already lots of people having a voice in the policy area, but where social science has not been one of those voices. So, under those circumstances it's not that we've got a new policy prescription that we want to put in place of the others, what we want to say is that these people are using an implicit model of what social preferences are, or what social opportunities are, which they're getting from scientists, or medics, feeling about what it is that people want, and that should be supplemented, where possible, to those things. Often, we didn't have that evidence. What we were trying to do was to make the case for them listening in addition to that kind of evidence, but that would only be the start of a policy process, and there was no guarantee that the policy process would be any different because it might be that those were right about what it was that people want. (GF4)

Therefore, in this setting, academics aimed not only to blur the boundary between science and policy, but also to engage in establishing a boundary between policy and social science.

This type of boundary-setting process was described by Akkerman and Bakker (2011) as *legitimising co-existence* – whereby one side of the boundary works to be seen as occupying a legitimately adjacent field. In the case of the Genomics Forum, the academics were aiming to legitimise the co-existence of social science with policy and with natural/biomedical sciences, as valid participants in the debate over the development of genomics. This was achieved, for instance, by structuring the workshops in such a way that the social science role was clearly acknowledged or by organising a debate between different disciplines, with social science as one of the voices. Therefore, social science first had to be established as an adjacent field, in order to then support the cross-boundary deliberation in workshops and seminars. Through this process, social science was established not only as both a legitimate partner and even a facilitator of policy debate, but also as an autonomous field which ought to be reckoned with.

7.3.3. Between constructive and destructive boundary blurring

A key issue, highlighted by Guston (2001, p. 400), is one of the scale of boundary blurring, for example by assessing "how much blurring is productive and how much might be destructive". This was an important problem for Fuse and the Genomics Forum since it soon became clear that the cross-boundary collaborations would not be fully satisfactory (or, indeed, desired) for either side, but would necessarily involve trade-offs. For academics, the problems had to do with academic publishing and

satisfying the norms of academic excellence (discussed in detail in Chapter 5). For policymakers, these forms of collaboration were perceived as still insufficiently aligned with their organisational priorities. As summarised by one of the practitioner interviewees:

> I think the boundaries can be blurred a lot more. When I worked in my previous role, I worked with one of the Fuse academics to fund a full-time researcher to be embedded in practice. […] We were spending quite a lot of money, bits and pieces of money. Kind of 10,000 here and there, or 15,000, or 20,000 to do some kind of evaluation. And myself and the professor at the time were saying, you know, "Why don't we just put it all together into a pot and just create a post?" And then they could work in practice, billing them to the academia. […] So, that was the aim. It was a co-production, on site, with public health practitioner and our researcher. […] Which I think is a really nice model of working. (Practitioner 6)

A few other policymakers and practitioners admitted that the embedded researcher (see also: Marshall et al., 2014) model would be preferred by them, as it would blur the boundaries even more. At the same time, this model of working could be damaging to a researcher's academic standing (Bruce & O'Callaghan, 2016), if it was perceived as involving an insufficient number of what would be considered legitimate academic practices (e.g. publishing, securing funding, etc. – see Chapter 6).

The "inside-outside" problem

The tension between the scale of blurring and setting boundaries speaks volumes to the central puzzle of the thesis – concerning the separation and integration models of science and policy (for an overview, see Chapter 1, Section 3). The issue with the scale of boundary blurring is directly linked to the question of academic autonomy, which is often portrayed as a necessary condition of science's epistemic authority (Grundmann, 2017; Owens, 2012; Smith et al., 2011; see Chapter 3 Section 2.2.3). And, indeed, academic independence was perceived by the decision-makers as an important asset of academics involved in the process of knowledge exchange. For example:

> I think having a link in formal research is always useful. And having that ability to have someone who can, you know, sort of work across the boundaries, so work across different organisations to bring them together to get the information you need. And I think I found that actually kind of worked quite well because they always identified as neutral as well. So, you know, we don't go to our commissioners. We

> don't go to our providers rather, as a commissioner, and say, "Can you update me on this?" And, you know, it's more to have this independent approach as well. (Practitioner 1)

Likewise, a member of a patient organisation working with the Genomics Forum observed:

> In both cases [of two academics from the Genomics Forum], they have done it [collaborated with the organisation] without compromising their academic integrity, as it were, which I think is important. Otherwise, you need the discipline that goes with having to produce peer review papers for high impact journals that really do tease out the nuts and bolts of the arguments that you want to make. (NGO partner 1)

The quotes above point back to the problem of academics' paradoxical position in policy (Bijker et al., 2009; Jasanoff, 1987), as the academics were expected to be simultaneously involved in the policy processes and independent of them. In other words, the policymakers felt that the academics should blur the boundaries to an even greater extent, but at the same time they expected the academics to present the independent position of a presumed outsider.

This paradox might be further explored by looking from the analytical standpoint of boundary work. Akkerman and Blekker (2011) labelled such a boundary process *maintaining uniqueness of intersectioning practices*. There are cases of cross-boundary collaborations (for example Akkerman & Blekker, 2011, who give example of interdisciplinary research) in which the necessary factor for the success of the collaboration is the ability to preserve, to a degree, the identifying qualities of both parties, rather than completely blurring the boundary between the two. Academic independence – and hence separation from policy and politics (or rather a perception of it) – seems to fall within such a category of uniqueness.

This could be illustrated by looking at different levels of acceptance of deviation from what was perceived to be the core activity between both groups. Academics had much stricter standards for acceptable levels of boundary blurring. As argued in Chapter 6, some academics (in knowledge brokerage positions or embedded researchers) felt they were penalised and perceived as administrative staff if working across the boundary for too long. By contrast, the policymakers did not have such strict perceptions of the boundary crossing process. They would perceive all of their partners to be "academic" regardless of their core responsibilities.

At the same time, the policymakers and practitioners saw the boundary of "politics" differently from the academics. In their perception, academics, although skilled at translating *evidence* into useable formats, were unable to bring this translation into the realm of political considerations. The practitioners or policy advisers saw their role as taking the message "a step further" (Policymaker 3), translating it into a *political* message, acceptable for politicians during the later stages of developing policies. Such considerations might include budgetary constraints or the electorate's presumed preferences, values and objectives. As argued by one of the practitioners:

> They get [the research evidence] to the point where the practitioner can translate. It's important that they can translate it to their local meaning. […] They don't get it to the point of the politician. And I wouldn't expect them to, actually. I would expect them to summarise it to a point so that the practitioner in the setting can translate to the audience. Because you always have to do it. […] So, it's about how you use the evidence to change hearts and minds. And get people on board. (Practitioner 3)

In that sense, the policymakers and practitioners were drawing boundaries of politics around different parts of the policymaking process, therefore differentiating between areas in which evidence might play a meaningful role and areas in which political, argumentative considerations might dominate. As such they engaged in drawing boundaries between "politics" and "policy" streams (Kingdon, 1984). Accordingly, the process of translation of evidence from academic formats into policy decisions was seen by policymakers and practitioners as a multi-stage development in which political values and particular considerations were increasingly introduced to the universality of evidence by different actors.

The policymakers and practitioners did not expect the academics to engage in the more political components of the process, as they acknowledged that they themselves, being more highly skilled in that area, were better positioned to engage in the political work, for example in dealing with ministers and local councillors. Interestingly, this perception of translation between evidence and politics was shared across the research users of both the Genomics Forum and Fuse, working on different stages of policymaking, from local to national to international and across different areas (e.g. public health, medical and environmental). This might suggest that the perception of "neutrality" towards political considerations was an important identifier of academic

work when working in-between science and policy, one that was a necessary guarantor of the quality of evidence, and consequently of the authority of science. (This issue of bounded portability of scientific authority will be discussed further in the following discussion chapter.)

7.4. CHANGING ROUTINES – PROCESSUAL IMPACT

One key consideration for both organisations – especially in their relationship with the funders – concerned the "impacts" of knowledge exchange work on policy and practice. As highlighted by the vast majority of the interviewees, even though informing policy and practice was one of the objectives of their work, in practice the notion of impact was challenging. Part of the problem was the conceptualisation of impact by the funders. Research impact in science policy (see: Chapter 2 Section 2.4.) and literature on knowledge exchange and utilisation (Greenhalgh et al., 2016; Penfield et al., 2014; Peter, Kothari, & Masood, 2017) is predominantly conceptualised in terms of the levels of evidence-informed change in policy and practice. And – perhaps unsurprisingly considering the vast literature on policymaking change (Bambra, Smith, Garthwaite, Joyce, & Hunter, 2011; Smith, 2013a) – interviewees in both policymaking and academia pointed out that such concrete "impacts" stemming from interaction with Fuse and the Genomics Forum occurred only in a minority of projects. For example:

> There's some definite pieces of work where they [Fuse] have directly influenced commissioning. There are some more pieces of work which have been interesting and have, maybe, added to an existing evidence base, but haven't necessarily, on their own, influenced a decision. […] So, I guess, in terms of the quantity of that I would say the list just comes down to sheer…the opportunity and also the finance, you know. The big ones, the babyClears, are fewer and far between, simply because of the scale and the cost of us having to do them. So, it's probably more 90% in favour of the smaller ones, but that's not to say that they're not useful, and it's not to say that the bar is not weighted in terms of small ones. (Policymaker 6)

The literature substantiates this perception by acknowledging that policy and practice change, in most cases, requires larger systemic transformation, in terms of values, political objectives, funding availability and so on (Best & Holmes, 2010; Greenhalgh et al., 2016; Nutley et al., 2007). And even though research is an important factor in such processes, research-driven policy change is rarely straightforward (Davies et al.,

2008), based on a single piece of evidence and research (Petticrew et al., 2004; Whitehead et al., 2004) or direct (Smith, 2013a). This is not to say that it is never possible to achieve research-based policy change, as both organisations managed to secure both instrumental and conceptual changes across multiple projects (presented in Chapter 1).

Regardless of the issues around the possibility of achieving direct impacts of research in policy, the interviewed decision-makers reported a very good level of satisfaction gained from interacting with academics through knowledge exchange organisations. One way in which these collaborations were useful, beyond direct translations of research into policy, was through their impact on the everyday practices of policymakers and practitioners, as explained by an AskFuse user:

> Again it goes back to how we change practice. You know, when we change the development of projects and how they're implemented. I think that's fundamentally been the most noticeable way we've been able to do that [take up knowledge]. (Practitioner 1)

Many research users acknowledged that interacting with Fuse (and particularly with AskFuse) changed the way they saw the role of research in the process of designing and assessing interventions and programmes. In the words of one interviewee:

> The first thing we learnt is that we should have thought about this five years ago, when we started doing the project. Before we [started the project] we should have thought out: Is this an energy scheme? Is it a health scheme? What do we want to find out at the end? What do we want to achieve? Does that make sense? The first thing we've learned is think about the health evaluation at the very, very beginning, rather than, "Oh, crikey, we've done [a lot of work] that could affect their health - we need to research it." Across the organisation, absolutely, in the future, if we did any energy-related scheme, we'd be thinking about that health research before we start. (Practitioner 4)

As highlighted in the quotes above, even when the particular projects or recommendations were not, or not yet, instrumentally implemented, the policymakers and practitioners gained experience in taking evidence-informed approaches to projects in ways that had the potential to shape future uses of research evidence. Therefore, by shaping the practices, collaborating with Fuse had the chance to influence future practices towards being more evidence-based. The vast majority of the policymakers and practitioners I interviewed reported that the most long-lasting impacts stemming from working with Fuse and the Genomics Forum went beyond

research "impacts" and rather had to do with changing organisational routines and adapting practices.

Therefore, as highlighted by the experiences of academics working in Fuse and the Genomics Forum, the dominant perspective on research impact – looking for direct changes in policy based on or informed by evidence – captures only a small proportion of the effects both organisations had on their broader environments. Hence, the conceptualisation of research impact could be expanded to account for these types of interactions. This type of impact – which I termed "processual impact" – involved changes in routines and practices, stemming from interaction with knowledge exchange organisations, and leading to implementation of new practices aimed at including evidence in the ongoing projects.

The processual impact on practices differed from capacity building, often discussed in the literature as one of the likely impacts of knowledge exchange work (Dobbins et al., 2009; Kearnes & Wienroth, 2011; Kislov, Waterman, Harvey, & Boaden, 2014; Nutley et al., 2007). Conducting research projects in these collaborative spaces went beyond just increasing capacity, as the policymakers and practitioners often already possessed the necessary knowledge and skills (as argued in Section 7.2). Therefore, rather than capacity building exercises, these projects supported the development of new "ways of practising" their everyday work by combining formal and experiential knowledge resulting from interaction with academic researchers, and carrying out projects (for example evaluations) with them. These changes entailed implementing practices which would lead to the conduct of future projects in ways that would support the inclusion of evidence.

The interaction with both organisations impacted on everyday practices of their research users, either in terms of changing their practices ("ways of practising" policy and practice) or in terms of considering different "ways of knowing" (Cook & Brown, 1999; Feldman et al., 2006) their policy knowledge through changing practices, for example by involving social scientists or civil society to introduce a wider variety of viewpoints.

Arguably, one element supporting such learning was the boundary blurring process discussed in the previous sections which supported creation of hybrid practices

between academics and policymakers/practitioners. Within these spaces, the use of research emerged as an everyday practice; hence, by navigating the boundaries between science and policy/practice, academics and policymakers managed to create an "interior world" (Bijker et al., 2009) at the boundary, in which new practices could be established (Carlisle, 2002).

Furthermore, the strategy of setting the boundaries has also led to lasting changes in everyday practice in more indirect, conceptual ways. For example, nearly all of the Genomics Forum's research users acknowledged that interacting with the organisation changed their approach to social science and many of them reported subsequently implementing social science-based considerations in their everyday policy practice. For example:

> It [collaboration with the Genomics Forum] changed my way of thinking, or added to my way of thinking such as it is. […] For example, on the work on [a technology] we have – we, I mean me and the [international organisation's] secretariat and our governments – have made efforts to work as closely as possible with the civil society organisations. So, we routinely engage them in meetings that we have. I think, before [working with the Genomics Forum], we might not have even thought to do that or we might have been a bit more exclusive, but I think we have been much more inclusive on the topic of [a technology] in recent...in the very recent years than we might have been some years ago. (Policymaker 5)

Another policy adviser reflected that interaction with the Genomics Forum influenced the way they communicated with the scientists in his department. This interviewee acknowledged that they would sometimes tell the scientists working in their department: "I wish you were a social scientist. I wish you described it differently" (Policymaker 3). The reason was that social scientists, in their opinion, could present a broader outlook on the environmental issues and communicate them in terms that would achieve a better fit with policymakers. This policy adviser further stated that they had considered hiring a social scientist in their department after working with the Genomics Forum, as it caused him to start thinking about the broader societal implications of genomics and related technologies. However, in the end, it did not happen because the adviser has retired and the focus within the department has shifted (perhaps pointing to the volatile character of policy work).

As mentioned by multiple interviewees, this form of impact was arguably difficult to trace, as the changes would go beyond singular projects to affect the ways in which the policymakers approached future projects. Therefore, even though this form of impact was perceived as central to supporting evidence-informed policy and practice, it was unmeasurable.

7.5. STABILITY AND FLEXIBILITY OF THE BOUNDARY

This chapter has thus far made several points about the science-policy/practice boundary in knowledge exchange practices. Knowledge exchange seen from the boundary perspective involves navigating a multiplicity of boundaries – both epistemic and institutional, inter- and intra-organisational. Even though the boundaries were overwhelmingly seen as obstacles to the achievement of successful knowledge exchange, the experiences of academics and policymakers and practitioners involved with Fuse and the Genomics Forum showed that at times setting boundaries was seen as a necessary starting point for carrying out knowledge exchange practices.

This section will explore how the boundary arrangements within both organisations were established. It will, therefore, speak to the central problem of this thesis, which is the relationship between the separation and integration models of science and policy, by exploring how they operate on a micro and meso level of organisations and projects conducted through collaboration between academics and policymakers. The relationship between the boundary arrangements and the types of impact unveils a unique attribute of the boundary between science and policy, namely that it is simultaneously malleable and stable. It is malleable in that it allows for the development of multiple different forms of cross-boundary practices (Akkerman & Bakker, 2011; Wehrens, 2014), so that the knowledge exchange process is not limited to a set of pre-existing assumptions. At the same time, the data point to the fact that once these new cross-boundary arrangements are settled and new practices are established, they quickly become relatively stable (akin to Guston, 2000).

7.5.2. Malleability of the boundary

Chapter 6 argued that research impact is not an objective phenomenon; its meaning is actively constructed by different actors. As a result, there is no one understanding of

"knowledge exchange" but rather a multiplicity of different meanings. This epistemic diversity was, on the one hand, welcomed as it permitted academics to employ a catholic view of both science and policy/practice and thus allow for openness and inclusivity. On the other hand, when translating different framings into specific sets of practices, the academics had to narrow down the understanding of knowledge exchange to one that would be acceptable to their members and associates, while also being translatable into practices deemed effective in realising the organisations' goals.

This tension was reflected in the fact that the representatives of both organisations took a considerable amount of time (up to a few years) to establish a model of operating (see the discussion on the sense-making process in Chapter 6 Sections 6.2 and 6.3). For example, the Genomics Forum, as one of the ESRC's pioneering investments in knowledge exchange activities, initially struggled to establish the overall conceptual framing of the organisation, as this type of organisation was new in academia and there was no clear frame of reference.

> It took [us] a while to work out, it was one of the useful things to work out – could we represent on one sheet of paper what the task of the Forum was? Not to write it down, but to draw it in some way. It's easy to think of a research centre. But what does a research centre look like that doesn't even do research, that does this knowledge exchange. Who takes social science research, but whose main audience is not social science. (GF4)

The lengthy process of sense-making in order to develop an organisational model of operating was also occurring in Fuse. The vast majority of interviewed academics associated with Fuse saw the establishment of AskFuse as the key moment in this process. One important aspect of developing this wider understanding was work carried out largely by the Knowledge Exchange Group – a cross-cutting theme group of academics across the other research programmes who were interested in knowledge exchange, including policy and practice partners working with Fuse. This work was recalled by one of the interviewees as follows:

> We had a good group of people who were on the academic side, but also in the policy and practice side. And the [knowledge exchange] group was set up to do that. And it still exists but I think in many ways what it was set up to do now is part of all Fuse, which is good. Because I think initially KE was a bit out on its own and banging the drum for this kind of agenda, whereas now I think the whole of Fuse has signed up to the fact that we are about the translational research, knowledge

> into practice and so on. Therefore, all we do has to have this kind of mission attached to it and that set of principles and ways of working. (Fuse 8)

Therefore, as depicted in the quote above, the Knowledge Exchange Group managed to spread the framing of the science-policy interaction in terms of partnership working across the whole organisation. The work conducted by the group has popularised the framing of the integration of research and practice and the move towards co-production.

> I don't think our intent has changed; I think the way we realise that has matured. Perhaps better recognition across everything we do the need to work in a partnership with people right from the beginning. So you could naively say that translational research in public health is about creating a product and pushing it out and telling people in practice, this is how you do it. This is somewhat naive; I don't know if we ever had that view. But we've learned much more about how we can engage with people right from the beginning and make them part of it. (Fuse 1)

As highlighted by these quotes, developing the organisational model of operation, understood as an overall approach to knowledge exchange, was an outcome of not only individual (described in the preceding empirical chapter) but also organisational sense-making. And consequently, the two organisations developed different approaches, with different levels of focus on utilitarian (problem-solving) and reflexive (enlightenment) approaches to knowledge exchange (see: Chapter 6 and Lövbrand, 2011).

The development of these organisational-level strategies assured the continuity of practices within both organisations, supported the establishment of routines, and formed the basis of scaling-up practices. In other words, establishing what the organisation is to the affiliated academics was the first step towards promoting this understanding to different groups of research users. The boundary between science and policy is therefore malleable – it can be reshaped and populated by diverse forms of engagement. Even though the Genomics Forum and Fuse were seemingly similar organisations – both financed mainly by public funds, involving navigation of a multi-university collaboration, pursuing the goal of impacting on policy and practice, being located at universities and employing mostly academics – the forms of engagement and forms of achieved impact differed. At the same time, these models of operation,

in order to be effective, had to be both flexible and stable – two characteristics that I will explore in detail in the following sections.

7.5.3. Stability of the boundary

The empirical data presented in this chapter indicate that the boundary between science and policy/practice is malleable; but that does not mean that it is perpetually unstable. Two aspects of the stability of the boundary were especially salient in this setting: firstly, the boundary was stabilised by the framing of knowledge exchange by both academics and policymakers/practitioners; secondly, it was stabilised by filtering out practices that were not completely aligned with the dominant framing.

One of the points to be made, based on the data, is that the policymakers and practitioners indeed interacted with different framings of knowledge exchange in significant ways. The vast majority of research users emulated the framings of knowledge exchange that were dominant in the organisation with which they collaborated. In that sense, the policymakers and practitioners expressed an understanding of knowledge exchange closer to Fuse or the Genomics Forum, rather than presenting a unified policymaker/practitioner view. For example, the predominant framing of impact in the Genomics Forum treated it as a broader learning (see Chapter 6, Section 6.3). In fact, research users from a multiplicity of organisations mirrored this framing. As an interviewee pointed out:

> That impact [of the Genomics Forum] might be casting light on understanding the economics of a situation. It might be casting light on understanding the extent to which there is societal demand, or societal push back against something. Actually, more effectively, it's about trying to create a dialogue, create a process, by which our societies can get to a point where there is a more nuanced understanding of opportunities and challenges around technology, which then would enable a policymaker to make more intelligent and more society levels and interventions. (Policymaker 8)

Similarly, the academics associated with Fuse predominantly framed their work as aiming to produce actionable evidence (see: Chapter 6 Section 6.3.), by working closely with partners in a co-produced way. Again, this framing has been echoed by the research users:

> I think that collaboration is really important because then you run a much bigger expertise base and you might have somebody with really good and quants and quals. […] They can have that ongoing

> relationship. That regular dialogue, be it on any topic. […] So, I think it also helps us to look at the gaps and work collaboratively between practice and academia about how we strengthen some of those gaps. […] Yeah, they're seen as a very key partner in a lot of our public health work so I'm busy working on my strategic plan for the next year. Fuse are an absolute key partner to the delivery of [our organisation's] work in the North East. (Practitioner 4)

These excerpts seem to suggest that academics engaged in knowledge exchange were able (at least to a degree) to shape the understanding of the knowledge exchange process and – consequently – policymakers' expectations of research. This is not unexpected, considering the previous sections, which have presented knowledge exchange work largely as a development of a space of shared meanings and practices developed by academics and policymakers where such framings could be co-produced (Jasanoff, 2004).

This stability of the framing of what it means to do knowledge exchange, shared between academics and policymakers/practitioners, undoubtedly plays an important role as it enables the development of the hybrid practices discussed in the previous sections. Furthermore, this model (like other organisational phenomena, see: Swidler, 1986; Weber et al., 2013) acted as a filter of possible or most desirable forms of engagement. This was particularly evident when the academics were discussing ways in which the organisations could have worked better. For example, some of the academics and policymakers associated with the Genomics Forum criticised its model of separation from policymakers, which they felt limited them to conceptual impacts:

> How does one take these social science insights and repackage and attempt to translate them and deliver them to those who might want to use the social science insights in a way which is directly usable? For instance, what the Genomics Forum was doing, was celebrating and disseminating the insights from the social sciences through a number of communication channels. Including using arts and humanities techniques. But, what it wasn't really doing was taking them and saying, "Alright, well let's now synthesise these insights, these analyses, these findings, into something which is practically usable by a group of individuals who are looking for a better policy understanding, but don't themselves have the skill set or the understanding or the scholarship to interpret what the social science is saying to them". (Policymaker 4)

A similar critiques could be identified in Fuse, but here some of Fuse's members argued that the organisation was too close to policy and practice and therefore not

critical enough (which is discussed in detail in Chapter 6, Sections 6.2 and 6.4). The quote above point to the fact that once organisations focus on more utilitarian or more reflexive models of interaction with policymakers and practitioners, they develop a set of accepted practices or "taken-for-granted" approaches (Colyvas & Powell, 2006). Providing the research users with a basis for different practices (Kislov, 2014) and framings to make sense of these different forms of collaboration stabilises the boundary between science and policy/practice.

7.6. CONCLUSIONS

This chapter has discussed the issue of evolving boundaries of academia and their impact on both policy and practice. The chapter began by acknowledging a diversity of boundaries present on the science-policy interface. Academics involved in Fuse and the Genomics Forum were faced with a multiplicity of different boundaries, both organisational and epistemological. However, these boundaries were not always aligned with each other. In particular, two areas in which organisational and epistemic boundaries did not align were approaches to the complexity of policymaking (where social scientists and policymakers were seen as being closer than social scientists and natural/medical researchers); and collaboration between universities, which was seen as sometimes more challenging than collaboration between academia and policy and practice.

At the same time, focusing on the science-policy/practice boundary seemed central to the interviewees, as it outlined the distinct differences in practice (hence, working as a division of labour mechanism). Navigating this boundary entailed two different strategies. One strategy involved blurring boundaries and thus creating a space where hybrid understandings and practices could be developed. The other strategy involved establishing a boundary in order to assure legitimisation of the co-existence of (social) science and policy areas. Both organisations employed these two strategies; however, boundary blurring was more central to Fuse's strategy whereas boundary setting was more common in the Genomics Forum. This chapter offered some insights into the characteristics of the boundary between policy and science, showing that it is paradoxically both malleable (as it offers the opportunity for development of various forms of boundary arrangements) and stable (as once the boundary arrangement is established it is reflected by the policymakers).

Looking at knowledge exchange as a boundary management practice might offer insights into the qualities of impact and the translation process. This is because, as argued by Carlisle (2000), the differences between diverse communities across the boundaries are not only semantic and syntactic (in language and meaning) but also pragmatic, and entail differences in practices. Wagenaar and Cook (2003, p. 141) in their work on policy as practice noted: "practice, in which the concept of action is embedded, is not just the executive arm of rational knowledge, but instead is a way of engaging with the world in its own right". This perspective is still underutilised in considerations of science in policy (Freeman & Sturdy, 2014), or to paraphrase Wagenaar and Cook (2003, p. 140) – the primacy of the epistemological in this area of inquiry has not been overcome. One illustration of the predominantly cognitive rather than practice-oriented approaches to science and policy discussed in this chapter is found in the approaches to research impact and evidence use, chiefly analysed from the perspective of changes in epistemic levels of policy, such as ideas, learning or awareness.

This chapter challenged the notion of knowledge as a precursor for policy change (or "impact"). As highlighted by the experiences of academics and policymakers and practitioners involved in knowledge exchange projects, the changes in knowledge and in practices are more closely coupled than that, and at times, changes in practices might even precede changes in knowledge. In the case of processual impact, policymakers and practitioners began to implement practices which supported later evidence-based decisions. Hence, changes in practices and routines predated and enabled changes in epistemic contents of decisions.

Finally, this chapter has discussed the complexity of the "politics" of knowledge exchange. The policymakers and practitioners saw the value of academics as residing simultaneously in the capacity for close collaboration and increased blurring of boundaries, and (by contrast) in the ability to remain impartial and "academic". I termed this problem "inside-outside", as academics were expected to be both internal players and external critical observers. Furthermore, the policymakers and practitioners drew boundaries around the politics of the policymaking process, hence delineating how far the academic translation of evidence can go. By doing so, they

were outlining the evidence work as distinct from political work (for example including context, values, economic priorities, etc.).

CHAPTER 8

DISCUSSION INTEGRATION, SEPARATION OR SYMBIOSIS?

8.1. INTRODUCTION

This thesis started out with a paradox: science is perceived as useful when it is either autonomous from policy or embedded within policy. This research has dealt with this paradox in two ways. Firstly, it explored the process of knowledge exchange from the perspective of academics, focusing on micro-sociological practices as well as processes of sense-making and meaning construction. This perspective, previously rather limited in the existing literature on knowledge in policy (with some notable exceptions: Matthews et al., 2017; Smith, 2013a), allowed the thesis to problematise the notions of knowledge exchange and co-production of research in a way that captures the epistemic diversity of both research and researchers. Secondly – a point which will be the focus of this penultimate chapter – through combining STS, evidence-based policy and organisational and institutional perspectives, this thesis aimed to explain this unique constellation of science and policy by introducing the concept of a *symbiotic* relationship between science and policy – one in which science and policy are closely intertwined yet distinguishable from each other.

One way of viewing the tension between autonomy and embeddedness of science in policy – and the way adopted in this thesis – is by looking at it in terms of separation and integration models of the science and policy relationship (Sundqvist et al., 2017). Applying this approach to knowledge exchange helps to go beyond "what works" approaches to research uptake (Cairney & Oliver, 2017) and instead opens up the inquiry to considerations surrounding more fundamental questions of the grounds for academic authority and the perception of the value of science in policy.

Different assumptions regarding the science-policy relationship inherent in separation and integration approaches are grounded in the age-old debate over the roles of universities in policy and the economy (Vincent, 2015). Even though this tension is

historical, as knowledge has always been central to power, events in recent decades have escalated the tension between the functional role of science (central to separation models) and its cultural role (providing ideological grounding to separation models). Pestre (2003) elaborated on this point by discussing a multiplicity of factors leading to a rearrangement of the relationship between science and the state, including the emergence of "risk society" (Beck, 1992) and complex problems, changes in market capitalism and globalisation from the 1970s onwards, changes in the structure of techno-science, and public crises of expertise. As a result of these changes, new regimes of knowledge production are being established within universities, regimes in which knowledge is socially accountable and oriented towards solving problems (Nowotny et al., 2001).

This focus on the emergence of these new regimes of knowledge production highlights the paradigmatic pluralism of the debate over the relevance of science in solving policy problems. Separation and integration views on the science-policy relationship draw on divergent ideological assumptions; for example cultural eminence vs functionalism (Vincent, 2015), autonomy vs accountability (Nowotny et al., 2001), or cognitive authority vs cognitive plurality (Jasanoff, 2003c). The historical grounding of these co-existing models of separation and integration – even though central to an inquiry into the co-existence of divergent regimes of knowledge production – is not the key focus of this thesis. Instead, this work has focused on the (arguably underexplored) problem of the *consequences* of these changes – entailing the persisting co-existence of these models in contemporary academia.

And this problem is increasingly central to the academic life, as became evident during the debate over the REF impact case studies. The arguments mobilised by this debate mirrored this very tension between science as integrated with or separated from policy. On the one hand, the integration approach is reflected in the arguments supporting engagement with the broader range of stakeholders (Dunlop, 2018; Pain, Kesby, & Askins, 2011; Smith & Stewart, 2017a). For example, Pain et al. (2011) have argued that the impact agenda might be an opportunity for academia to become more participatory and called for more socially accountable universities that co-operate with different stakeholders in knowledge production. Flinders (2013) argued that the

research impact agenda might steer academics towards enhancing the "art of translation" and consequently improve scholarship and the visibility of the value of social science.

On the other hand, the separation perspective is evident in arguments mobilising notions of freedom as core – and jeopardised by the research impact agenda – academic value (Colley, 2014; Holmwood, 2011; Murphy & Sage, 2014; Slater, 2012). For example, Slater (2012), in response to Pain et al. (2011), argued that calls for participatory approaches to research are a threat to the autonomy of researchers. He highlighted the statement: "Precious to scholarship is the ability to ask our own questions" (Slater, 2012, p. 118). Slater (2012) perceived the calls for a two-way research process as an invitation to censorship, especially in cases where researchers co-operate with policymakers. This point was in line with another argument critical of the impact agenda, which highlighted the risks to scholarship that challenges the existing status quo and power structures (Eynon, 2012; Smith & Stewart, 2017a; Watermeyer, 2014). These arguments not only criticise the lack of autonomy but also focus on the consensus inherent in the integration view on science and policy (as described by Sundqvist et al., 2017). These accounts point an disadvantaging of critical research in the impact agenda since research arguing for in-depth systematic change is by its very nature contradictory to the consensus narratives.

This tension is further embodied in the evidence-based policy literature by the contrast between technocratic models of evidence assessment and models that assume a close fit of evidence to policy context (Evans, 2003), for example by focusing on the appropriateness of evidence and its alignment with existing narratives (Fischer & Forester, 1993; Greenhalgh & Russell, 2006; Parkhurst, 2017). These two ways of understanding evidence in policy assume contradictory models of the legitimacy of evidence – based either on its objectivity (hence separation) or on its fitness to existing discourses and practices (hence integration).

The symbiotic model of science and policy discussed in this chapter helps to explain the paradoxical notion of the authority of academics in policymaking. In the contemporary setting of increasing closeness of science and policy, the value of

science does not stem purely from the separation of science and policy (or "speaking truth to power"); nor is it wholly based on the co-produced utilitarian values advocated by Mode-2 science (or "socially distributed expertise" Nowotny, 2003, p. 155). Instead, it is dynamically constructed through navigation of both closeness with policymakers and autonomy from the politics of the policymaking process (Sundqvist et al., 2015). This symbiotic approach is based on two main presuppositions: firstly, it shows that the notion of the effectiveness of science in policy is complex and is driven by contradictory institutional and cultural forces which are constructing two opposing ideals of usefulness – the critical and the utilitarian (cf. Lövbrand, 2011; Smith, 2013a); secondly, it argues that the two models of the relationship between science and policy – separation and integration – are linked together through the concept of legitimacy. The following sections will explore these themes in greater detail.

8.2. LEGITIMACY AND EFFECTIVENESS OF SCIENCE IN POLICY

As highlighted throughout this thesis, the notion of expertise (and more broadly the value of experts in policy) is an encultured and institutionally determined phenomenon (see: Chapter 1 Section 1.3). As such, the concept of expertise is tightly coupled with the broader organisational and institutional environment in which experts operate (Jasanoff, 2005). A concept that might be helpful in explaining the position of experts in policymaking is that of legitimacy (Boswell, 2009b). And this focus is not surprising, since the legitimacy of organisations is essential for organisational survival (Weber, 1978), is among the central themes in institutional and organisational analysis. An organisation's legitimacy is closely connected to (but not necessarily determined by – see: Deephouse & Suchman, 2008) its effectiveness in carrying out the assigned tasks. However, the effectiveness of science-policy interactions is a complex issue and this complexity is at the core of the paradigmatic pluralism of knowledge exchange explained in this thesis. The literature is replete with analyses of what practices and strategies are *effective* in achieving evidence-informed policy and practice (for example: Contrandriopoulos et al., 2010; Mitton et al., 2007; Oliver et al., 2014), but the exploration of what practices are *legitimate* to policymakers and academics is

sparser. Legitimacy in knowledge exchange literature (see: Chapter 3 Sections 3.2.5 and 3.3) is predominantly analysed from the standpoint of legitimacy of evidence and credibility of its producers rather than legitimacy of the - increasingly institutionalised – knowledge exchange practices (Liverani, Hawkins, & Parkhurst, 2013).

What might be more insightful here is the literature discussing boundary organisations, which highlights that one of the challenges of such organisations is their "dual agency" (Guston, 2001) whereby legitimacy is owed to both science and policymaking (Kearnes & Wienroth, 2011; Lander, 2015). This expectation is often cited as a key challenge for boundary organisations which need to engage in a constant process of negotiation between different stakeholders. As argued by Parker and Crona:

> Boundary organizations exist at the nexus of complex, often incommensurable sets of tensions. Effective boundary management requires identifying these tensions and working to manage them in relation to changing circumstances. (Parker & Crona, 2012, p. 284)

As argued throughout this thesis, dealing with such "incommensurable tensions" has become a reality for academics working in knowledge exchange projects. Therefore, as a result of the trend within academia to move towards impact, this dual agency, previously characteristic of boundary organisations, is becoming an increasingly common factor of academic life. The following sections will aim to untangle this tension within the dual agency of knowledge exchange by exploring ways in which institutional paradigms and the notions of effectiveness and legitimacy are intertwined.

8.2.1. Effectiveness of science in policy

One key manifestation of the tension between the different institutionalised paradigms of impact and excellence in academia discussed in this thesis (in particular in Chapter 6) was the multiplicity of different understandings of knowledge exchange – and consequently, framings of what constitutes an "effective" knowledge exchange strategy and practice. A particularly salient point of contestation was the conflicting perception of whether it was meant to "open-up" or "close-down" (to borrow Stirling's (2008) terms) the policy deliberation (for an in-depth discussion see: Chapter 6, Sections 6.3 and 6.4). The academics working in Fuse and the Genomics Forum perceived the desirable outcome of their activities to lie on the scale between the more

abstract (knowledge-oriented) and the more concrete (practice-oriented). For example, some interviewees – predominantly in the Genomics Forum – thought that they were not meant to answer policy questions, but rather to ignite reflection, stimulate learning or even challenge ways of thinking (and so to "open-up" the debate by introducing new voices and ideas). Others – mainly in Fuse – thought that this approach was not sufficient, as it would not lead to changes or improvements in policy and practice. Therefore, they saw knowledge exchange as an issue of finding optimal solutions to problems (hence "closing-down" the debate on desirable outcomes).

The notion of "effectiveness" itself was discussed as an epistemologically, institutionally and culturally determined phenomenon and one that is deeply immersed in the problem of separation and integration of science and policy. This issue is not new, as Robert Merton pointed out in the 1940s in his discussion on the role of intellectuals in bureaucracy:

> If the intellectual is to play an effective role in putting his knowledge to work, it is increasingly necessary that he become a part of a bureaucratic power structure. This, however, often requires him to abdicate his privilege of exploring policy-possibilities which he regards as significant. If, on the other hand, he remains unattached in order to provide full opportunity of choice, he characteristically has neither the resources to carry through his investigations on an appropriate scale nor any strong likelihood of having his findings accepted by policymakers as a basis for action. (Merton, 1945, p. 411; cited in Lövbrand, 2011, p. 234)

The two types of engagement discussed by Merton (1945) – aimed at being closely involved with policymakers and limiting the scope of explorations, or aimed at presenting a detached perspective but limiting the scope of influence – not only speak directly to the main puzzle of this thesis, but also indicate two different meanings of effectiveness inherent to knowledge exchange. These two meanings could be summarised as effectiveness by the means of application and by the means of contestation.

The first meaning assumes *effectiveness by the means of application*. According to this understanding, science is effective because it helps to provide knowledge that might be used in specific cases to solve problems or improve policies. This understanding of

effectiveness was embodied in academics' perceptions of knowledge exchange as a process of providing the answer to the "so what" question and "closing the circle" (see: Chapter 6, Section 6.4). In that sense, it is closely aligned with what Lövbrand (2011) described as the normative framework of co-production (see: Chapter 6 Section 6.3), in which research users are actively engaged in producing, interpreting and funding research. This meaning of usefulness is widespread – either implicitly or explicitly – in some strands of the literature, for example one on knowledge utilisation as it rests on an assumption that the application of knowledge in practice is desired (Boswell, 2009b). Furthermore, this understanding of effectiveness of science in policy is predominantly employed in science and research funding policy. Ever since the 1990s and particularly in the 2000s, the funding system in the UK has been increasingly narrowing down the meaning of "impact" to embody this understanding of the effectiveness of science in society (see the overview in Chapter 2). Seeing the impact of science as "an effect on, change or benefit" assumes that science is useful when it is applied to solve societal problems (Weiss, 1979; see also: Boswell & Smith, 2017).

Nevertheless, the problem-solving model has been shown time and again to account only for a minority of changes in policy and practice (Amara, Ouimet, & Landry, 2004; Ingold & Monaghan, 2014; Monaghan, 2011). However, there is another meaning of the effectiveness of science employed in this setting, one which assumes *effectiveness by the means of contestation*. Science is effective because it is challenging, offering an outsider's view, and providing a space for critical thinking. This understanding of the effectiveness of science was broadly, but not exclusively, employed by the Genomics Forum academics who saw their role as enabling broader learning or challenging policymakers' views. Remarkably (as it is contrary to research funders' understanding of research users), this meaning of effectiveness was also employed by some policymakers who appreciated collaborating with academics because they were "telling them what they do not want to hear" (Fuse 11). This definition is more closely aligned with Lövbrand's (2011) reflexive models of co-production, as this notion of effectiveness assumes that science is being successful if it opens up the debate and brings in additional perspectives, rather than solving the problem at hand.

These contrasting framings of effectiveness were also a key issue in developing practices, as they were directly translated into specific knowledge exchange strategies. Here, the main tension was between practices which would provide potentially directly applicable knowledge (considering the fact that the decisions are usually made in consideration of other aspects, going beyond just academic research) and practices which would produce knowledge that was more academically- than policy-driven. This required academics to balance long-term and short-term projects, creating a tension between the effectiveness of a strategy (e.g. producing policy knowledge) and its legitimacy in terms of acceptable academic practice. The issue of the multiple meanings of effectiveness also seems to point to the fact that different concepts of proximity of science and society (as exemplified in the separation and integration models) not only reflect different models of authority and credibility but also imply divergent notions of the value of science and its applicability.

8.2.2. Legitimacy of knowledge exchange

Co-existence of these two understandings of effectiveness of science in policy renders the legitimacy of knowledge exchange practices challenging, particularly considering the fact that the organisation studies literature often posits effectiveness as the central (although not the only) source of legitimacy for organisations (Deephouse & Suchman, 2008). Suchman (1995, p. 574) defines legitimacy as: "generalized perception or assumption that the actions of an entity are desirable, proper, appropriate within some socially constructed system of norms, values, beliefs, and definitions". This definition points to the source of the problem with the legitimacy of boundary practices such as knowledge exchange – it lies in the plurality of norms, values and beliefs with which the organisations have to abide.

And, indeed, the legitimacy of knowledge exchange practices was challenging to academics. The empirical findings presented in this thesis illustrated that the tension between expectations of scientific excellence and of policy relevance was central to everyday experiences of academics working in knowledge exchange projects. The issues with legitimacy assigned to the status of an academic might be explained by Pfeffer and Salancik's (2003) observation that legitimacy is one of the concepts whose

absence is more easily noticeable than its presence by the people working in organisations.

One way to approach the problem of legitimacy of knowledge exchange practices (and lack thereof) is to ask: legitimacy for *whom*? As argued by Meyer and Rowan (1977), both legitimacy and resources, as survival strategies, come from efficiency of the organisation but also from responding to institutionalised "myths" of the wider environment. In the cases of Fuse and the Genomics Forum this wider environment consisted of various stakeholders, both academic and non-academic, creating a complex network of lines of credibility (cf. Guston, 2001). Even though the main source of financing came from research funders, the remit of the organisations made them accountable for achieving forms of "impact" (broadly speaking) on non-academic audiences, thus rendering them legitimate not only to their academic environment but also to the research users. In that sense, different aspects of work conducted by the academics working in Fuse and the Genomics Forum were guided by different institutional logics, as the legitimacy for different audiences would stem from engagement in different epistemic practices. For example, it might be reasonable to assume that policymakers more dominantly expected practice aligned with the logic of impact rather than the logic of excellence, whereas the broader academic community and the funders at least to a degree prioritised practices drawing on the logic of excellence. This is analogous to the common narrative in the literature, which is that academics (often strategically) opt for a separation model – with the focus on autonomy and centrality of research rigour as a guarantor of the authority of knowledge claims (Bijker et al., 2009; Hilgartner, 2000; Jasanoff, 1990). Meanwhile, policymakers are portrayed as preferring integration and relevance to the rigour of knowledge claims (McGill et al., 2015).

Nevertheless, this thesis – even though confirming the contradictory expectations of academic and policy audiences – has challenged this common framing, revealing a more complex dynamic between different types of knowledge and their legitimacy. The key contribution of this thesis is the insight that these two models do not entirely align with the division between scientists and policymakers. Rather, both groups draw on both types of rhetoric. Academics, as argued in Chapter 5, drew their legitimacy to

fellow academics (and to a degree to their funders, see Section 5.3.2) predominantly from the production of excellent research; nevertheless, achievement of research impact was perceived as having additional status and value, particularly in the era since the introduction of REF. Similarly, policymakers saw the academics as legitimate based chiefly on their ability to produce knowledge that was appropriate to the context, but at the same time they expected impartiality and value-free knowledge. This duality was clearly exemplified by the Inside-Outside problem discussed in Chapter 7 in which academics were expected to blur boundaries between science and policy/practice while remaining independent from them. Therefore, I argue, the legitimacy of academics working in such boundary positions could be described not in terms of dual legitimacy of links to policymakers and academics (as suggested by the boundary organisations literature; see: Guston, 2001; Parker & Crona, 2011), but rather as quadruple or *four-streamed legitimacy*. This model is presented in Figure 4.

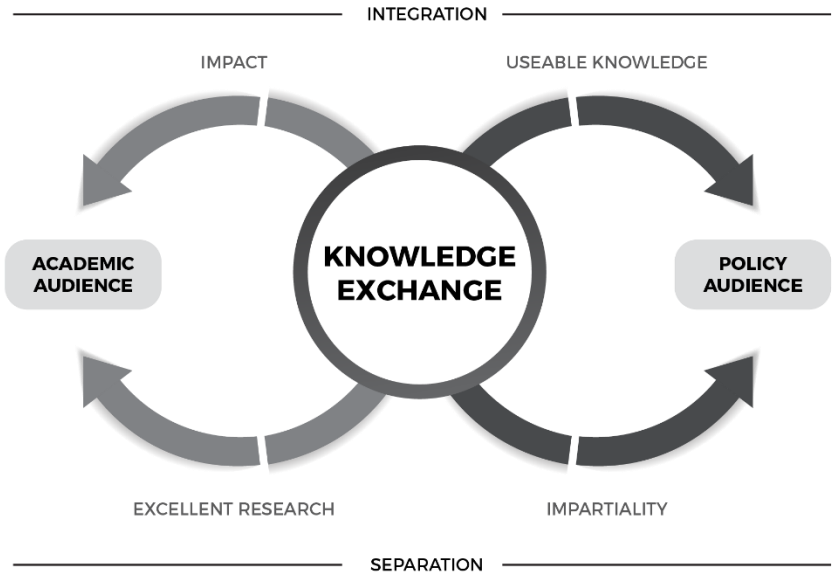

Figure 4. Four streams of legitimacy of knowledge exchange.

As illustrated in Figure 4, achieving legitimacy in the eyes of academic audiences (explored in detail in Chapter 5) requires a relationship between the scientifically excellent knowledge which is produced (Stream 1) and the policy-relevant knowledge which it validates (Stream 2). Achieving legitimacy for policy audiences requires effectiveness in producing useable knowledge (Stream 3), which must be validated by markers of academic impartiality and reliability (Stream 4). The sufficient levels of

applicability of knowledge were achieved by developing shared practices and embedding the work in context. The impartiality, on the other hand, was assured by scientific methodology reflecting unbiased "truth" about nature as well as critical analysis seen as a proxy for lack of partisanship. As represented in Figure 4, the model of separation of science and policy is embodied by two linked concepts: excellence of research (hence production of de-contextualised knowledge) and independence (hence production of knowledge devoid of personal and political interests). The integration models, on the other hand, are embodied by the concept of impact (to academic audiences) or usefulness (to policymakers).

Therefore, the legitimacy for both scientific and policy audiences is based on both the separation and integration models. Consequently, knowledge in policymaking has to be produced in a hybrid way, combining the technocratic model of scientific knowledge production with its focus on methodological rigour, and social and political models of applicability of knowledge in specific contexts.

8.3. SYMBIOTIC MODEL OF SCIENCE-POLICY RELATIONSHIP

Throughout this thesis I have examined how the tension between separation and integration of science and policy plays out – at points explicitly, at others implicitly – on an individual, organisational and institutional level within knowledge exchange processes. Navigating separation and integration was necessary for academics to design hybrid practices (Chapter 5) when carrying out the process of sense-making aimed at conceptualising frameworks of knowledge exchange (Chapter 6), and when negotiating spaces for shared practices while maintaining academic independence (Chapter 7). The sources of these tensions were multiple – epistemic qualities of different types of knowledge used in policy and academia, value systems of academics and policymakers, or institutionalised systems of incentives. One of the key findings that emerged from the empirical chapters presented in this thesis is that neither separation nor integration appear in the data in pure form and, in reality, these two ways of operating always co-exist. As summarised in the introduction to this thesis, the co-existence of separation and integration models is explained by two dominant

narratives: one assuming that it is a part of argumentative work conducted by the experts in order to yield influence on policymaking; and one assuming an evolutionary move towards integration models as a dominant paradigm of science-policy interaction.

The previous sections presented two theoretical insights arising from synthesising the findings discussed in this thesis: 1.) the effectiveness of academics in policy has double meanings, entailing application of knowledge or contestation of existing framings; and 2.) the legitimacy of knowledge exchange entails both separation and integration models for both academics and policymakers/practitioners. These arguments form a foundation for a re-conceptualisation of the relationship between science and policy, with the aim of problematising the co-existence of separation and integration models.

In order to deal with this paradox, I introduce the concept of a *symbiotic* relationship between integration and separation – in which they are closely intertwined but yet distinguishable from one another. Science and policy have to be separated and integrated at the same time to assure the quality, effectiveness and epistemic authority of the use of science in policy. In other words, as indicated by the experiences of academics involved in knowledge exchange projects, effective interactions between science and policy have to entail expressions of both academic rigour, independence and neutrality; and the ability to work across the boundaries and contextualise evidence in the political setting, with its interests, timelines and rhetoric. And this is the fundamental element of the symbiotic model – the relationship between science and policy could be understood in terms of a scale (similarly to the argument put forward by Sundqvist et al., 2015) in which the proportions of separation and integration differ but both are always present (see: Figure 5).

A closer look at the various forms of engagement between academics and policymakers, ranging from workshops and seminars to co-produced projects and embedded researchers, has shown that, in fact, they can be carried out at diverse levels of separation and integration. Even strategies generally associated with integration models might in fact draw to a large degree on separation models. One example here is the Genomics Forum's workshop model which – even though grounded in close

engagement with policymakers – was largely aimed at dialogue and deliberation among different voices, rather than shared production of knowledge aimed at problem solving. Therefore, engagement with non-academic actors does not require a new framing of science-society relations, as the main difference between the two models lies in the way this engagement is carried out, rather than whether it happens at all.

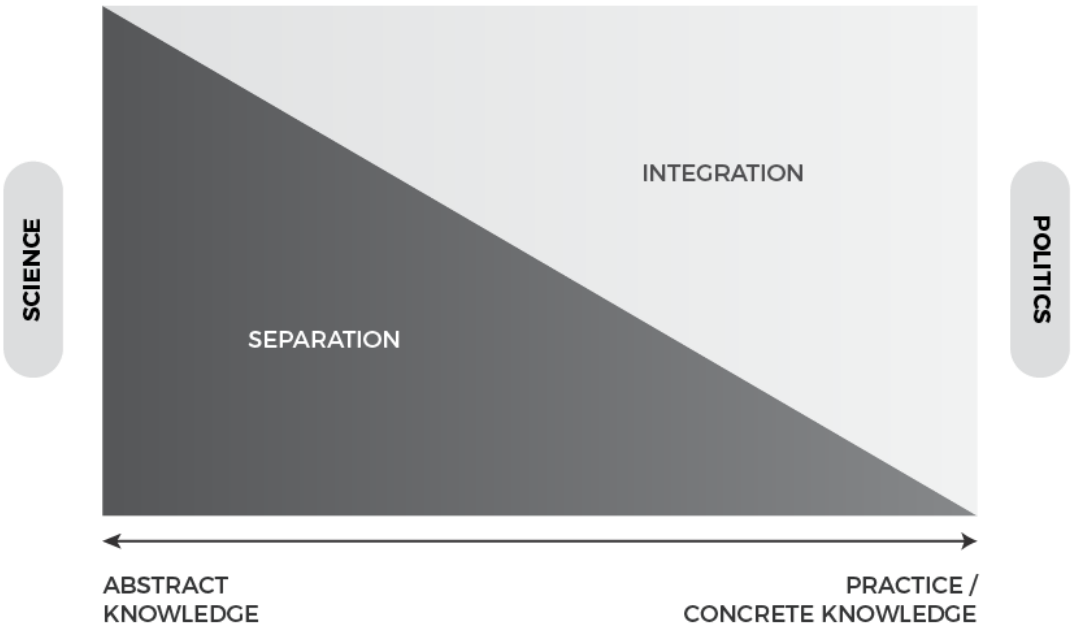

Figure 5. Symbiotic model of science and policy.

Conceptualising the relationship between integration and separation as symbiotic offers a new understanding of the epistemic authority of science. The sources of expert (academic) authority are not unequivocal in the literature. On the one hand, academics working in policy are influential because they achieve "epistemic gains" (Jasanoff, 2011c) by "speaking truth to power" and adhering to scientific methods (Jasanoff, 2005). This model relies heavily on the impartiality of scientists as their "moral virtue" (Grundman, 2017), with the authority of science stemming from a clear distinction between "truth" and "power" – facts and politics. However, multiple scholars have shown that in fact scientists are not devoid of interests or values (Nelkin, 1975; Weingart, 1999). Nevertheless, even considering the shortcomings of this model of expertise, science has "managed to maintain its functional cognitive authority in politics" (Hoppe, 1999, p. 202).

On the other hand, there is an argument according to which expert authority stems from providing value to policymakers. Hoppe (1999), among other scholars (Boaz & Ashby, 2003; Parkhurst, 2017; Parkhurst & Abeysinghe, 2016), points to the broader social and political context in which knowledge and expertise are used, including democratic modes of decision-making and the broader context of accountability (Jasanoff, 2003a). A similar argument was made by Arnoldi (2007), who, by applying Bourdieu's concept of a field, argued that in fact an important source of authority of some academic fields is their proximity to power which makes their expertise potentially more valuable in practice. Fields which do not have direct access to power (as embodied in government, administration or even media) would therefore not draw their capital from "practicality" but instead would be more autonomous.

This thesis challenges the duality of models of academic authority based on either autonomy of science from social and political context or based on the close embeddedness with society. Instead it proposes an outlook that bridges these contradictory accounts. As shown throughout the thesis, the authority of science does not stem completely from the separation of science from political and practical considerations (Haas, 2004); but nor can it be fully based on contextualisation and appropriateness to context (Gibbons et al., 1994; Nowotny et al., 2001). The "functional" authority of science in policy stems from navigating two contradictory expectations: of relevance to policy and society but simultaneously maintaining the position of the "critical outsider". The authority and value of science based on the symbiotic model is portable, as it can travel across different contexts (Jasanoff, 2004; Star & Griesemer, 1989); at the same time there are limits to this portability. Because the authority and value of science are determined by both separation and integration models (as illustrated in the four-streamed model in section 8.1.2), the qualities that deem academics valuable might in their extreme form provide a barrier to usefulness in policy. On the one hand such a barrier is the concept of excellence of research – as was evident in cases where RCT had to be abandoned lest the limited timelines exclude some forms of research and researchers (see: Chapter 7). On the other hand, the barrier could be the academic independence, causing the notion of "politics" to limit areas to which academics could potentially contribute.

8.3.1. What determines the place on the scale?

The findings presented in this thesis and summarised in the preceding section highlight that, in order for knowledge exchange practices to be seen as both legitimate (to academics and policymakers) and effective (in both application and contestation), they have to signal elements of both the separation and integration models – for example applicability of knowledge in specific political and social contexts as well as academic rigour and independence. Seeing the relationship between them as a spectrum begs the question: what determines the place on this scale?

As argued throughout this thesis, separation and integration models are being institutionalised in academic settings in the form of institutional logics and the hybridity existing between those logics. Chapter 2 has shown that co-existing logics often lead to "creative tensions" (Martin et al., 2017) for the academics who have to comply with guiding logics which were at times contradictory. One particular way in which the presence of conflicting institutional logics affects the institutions is by guiding contradictory behaviours. This was shown clearly in Chapter 5, which illustrated ways in which different categories of practices, in particular producing policy knowledge and producing academic knowledge, were seen as contradictory and in competition with each other (for example in terms of academic workloads). This is akin to an observation made by Binder (2007), that different actors within organisations might develop their versions of hybridity of logics which do not have to be consistent across the organisation (as they might find their own ways of realising organisational goals).

The ways in which different institutional logics co-exist or are layered is a newly developing area of inquiry. As suggested by Martin et al. (2017), one of the issues is that strands of literature discussing co-existence of contradictory logics is employing macro- and micro- levels of analysis rarely talk to each other. However, this exploration is crucial for understanding the determinants of the position on the scale between separation and integration. As maintained throughout this thesis, the Genomics Forum and Fuse drew on institutional logics of impact and excellence in varying proportions. For example, academics working in the Genomics Forum saw

their roles as mainly impacting on knowledge (learning, challenging) and carried out their work predominantly using translational practices such as workshops or seminars, drawing on the logic of excellence. Academics working in Fuse saw their role as mainly providing actionable research and – to a lesser degree – advocating for policy change, arried it out with a mix of translational research and production of policy research, therefore drawing on the logic of impact to a greater degree. This difference seemed striking, as both organisations had similar structures (e.g. focus on managing a collaboration between universities, resources (public funding), and structure (location at a university).

This variation might be explained by looking at micro-, meso-, and macro-level factors that distinguished both organisations. Macro-level factors influencing the position on the scale were seen as among the central determinants of the position and change of the position (moving towards integration). The factors outlined by the interviewees included changes in science and research policy, but also in the policy and institutional context in which the organisations operated, such as the structure of the policy problems, economic policy (cuts to public spending), or level of policymaking. One key fact was introduction of REF impact case studies in 2014 (and a number of years leading on to the assessment) which changed the perceived legitimacy of the policy-oriented work and significantly affected the incentive system, for example in terms of academic careers.

Another macro-level factor influencing the position on the scale had to do with the types of policy problem with which the organisations worked. As argued by Boswell (2009b), the level of polarisation of the policy issues could influence the type of evidence used by policymakers. Similarly, Michaels (2009) argues that the type of policy problems determines the approach and possible outcome of knowledge brokering. Both scholars argued that the more politicised the policy area, the lower the chances of direct, instrumental uses of research by the policy actors. This was also the case in Fuse and the Genomics Forum. The Genomics Forum was working on more emerging and hence contested issues, such as DNA testing or genetically modified crops (the Genomics Forum, 2013; ESRC, 2015). In this polarised environment, highlighting impartiality and focusing on broadening the debate was seen as a more

fitting strategy (which is discussed in Chapter 6, Section 2.1). Similarly, some of Fuse's academics who were working in another contentious area, namely health inequalities, highlighted a need to retain critical perspectives, which might be impaired by a close collaboration between academics and policymakers. Therefore, in this case the more polarised policy areas would support higher levels of separation, as opposed to integration; whereas areas of consensus would determine an integrative approach.

Nevertheless, the macro-level factors, in particular those impacting on changes in funding research, do not offer a full picture. Quite the opposite – approaching such a complex institutional change purely in terms of changes in resource environment would be reductive (as highlighted for example in the critiques of resource-based theories of institutional change; see: Binder, 2007). Fuller understanding might be provided by looking at the ways in which these field-level changes influenced the meso-level of organisations. The position on the scale – or whether the project was drawing more extensively on the logic of excellence or the logic of impact – was determined by structures on various levels, reflecting the multi-level "delegation of authority" between funders and various academic structures that characterises science policy (Guston, 1996; Klerkx & Leeuwis, 2008). For example, the science policies are filtered out into practices by the universities and their managing structures. One such factor discussed by interviewees was REF management. As discussed in Chapter 5 Section 5.3.2, one of the considerations in navigating impact-oriented and research-oriented practices was the REF process, with academics taking into consideration the feedback of REF coordinators. This had very specific implications for developing institutionalised practices, considering the highly compartmentalised model of the REF (divided into outputs, impact and environment sections; see: REF 2011b). Consequently, this compartmentalisation is translated into institutionalised practices by structures, roles and processes for managing REF within universities, as indicated by the interviewees who saw academics in these positions as gatekeepers of "how much" impact activities are still acceptable. Furthermore, this compartmentalisation of impact and research goes beyond just navigating the REF; for example, the structure of impact support (specific positions or units – RAND, 2014) or priorities (additional

positions in strategies or career incentives) emerge to manage impact and research as if they are separate entities (as discussed in Chapter 2 Section 2.6.).

Another university-level factor indicated by the interviewees was the organisational culture of the universities. As discussed in Chapter 2, the impact did not emerge in a vacuum but rather encapsulated values, meanings and practices which were already happening within universities (albeit not on the same scale and at the same level of institutional legitimacy). And there was a significant difference across the universities engaged with Fuse and the Genomics Forum. Here an important factor was the history of the university. Post-1992 universities were seen as better adapted to supporting impact activities. Some interviewees saw them as being closer to local government (for example via training). Another example was a perception of Newcastle University (one of the civic universities, historically focused on practical knowledge – see: Vincent, 2015) as oriented towards policy and practice and supportive of knowledge dissemination. For example, as highlighted by one of the interviewees:

> I think it [engagement with non-academic audiences]is also driven by universities in general being more sort of outward facing. I mean, here at Newcastle, for example…It's regarded as a civic university, and therefore it has three what's called societal challenge themes. One is aging, one is sustainability, and one is social renewal, and the whole point of those institutes—they're virtual institutes—is to engage with people outside the university. So, that influences people as well, I think. (Fuse, 15)

Finally, the position on the scale was also determined by the micro-level factors, such as individual practices, values and preferences, which suggests that the academics had scope for autonomy in shaping their position and ways of balancing integration and separation. As outlined in the Introduction to this thesis, this work benefitted from a view of institutions as "inhibited" by individuals (Hallett & Ventresca, 2006; Powell & Colyvas, 2008). Therefore, the academics are not just passive recipients and implementers of different institutional logics; instead they have a scope of discretion in the ways in which the logics are implemented and the new meanings emerge in interaction with each other. Consequently, there was no one unified response regarding the ways that separation and integration of science and policy (or – logic of impact and logic of excellence) were enacted in knowledge exchange spaces. Instead there are

some identifiable "pockets of discretion and autonomy" (Ventresca, 2006 cited in Binder 2007).

Just as in Binder's (2007) research on non-governmental organisations, the academics managed to combine their personal belief and value systems and systems of meaning to shape practices that would allow them both to express these particularities and to realise their organisational goals (e.g. working in partnership to support evidence-based policy changes). Not one of the interviewees enacted only a single institutional logic; rather they created and adapted the meaning of their work as well as their practice on the basis of elements of both logics. For example, as argued in particular in Chapter 6, academics' framings (and consequently practices guided by these framings) of knowledge exchange were based not only on strongly normative framings of science and what it should be doing (for example. responding to questions or abstaining from interacting with them) but also on the personal value systems of the interviewees. Furthermore, this position on the scale would be shaped by previous practices; thus, some academics working in Fuse said that a collaborative way of working was something they were always engaged in, so that a focus on impact and knowledge exchange was a way of reframing their experiences.

8.4. BEYOND EVOLUTIONARY MODELS

The discussion on the co-existence of integration and separation models presented in the previous section offers an insight into the way integration models have gained prominence in recent decades. One dominant perspective on the new modes of knowledge production is to see them as an evolutionary transformation of the science system (e.g. Gibbons et al., 1994; Nowotny et al., 2001). Consequently, the literature on new modes of knowledge production is often criticised (Hessels & van Lente, 2008) for insufficient theoretical consideration of how to account for practices aligned with the "new mode" that have been occurring in the past and how to theorise the change between different systems (hence the arguments over empirical validity) (Etzkowitz & Leydesdorff, 2000; Fuller, 2005; Rip, 2002). Furthermore, others argued that the Mode-2 science authors imposed an evolutionary perspective on this socio-technical

change, hence ignoring the political and social shaping of knowledge production in contemporary societies (Arnoldi, 2007; Pestre, 2003).

The symbiotic model of the science-policy relationship, understood as the hybridity of two institutional logics, seems to offer a more nuanced understanding of the way new modes of knowledge production are institutionalised, particularly in terms of changes from one model to another. As argued in the preceding section, the relationship between legitimacy and effectiveness in this setting is a complex one which leads to an interconnecting dynamic of separation and integration in such a way as to make them inseparable in academic practice. Consequently, moving from one model of science to another involves co-existence of the two, with the increasing proportion of practices that used to be illegitimate/peripheral to academic practice now moving towards a more central position. For example, as recalled by multiple interviewees, some practices that they had participated in throughout their careers were not seen as legitimate until the recent changes in research funding were introduced (akin to Smith & Stewart, 2017a). As one interviewee observed:

> In the past, and I go back probably 10-12 years now, senior people have said to me: 'You do this work with schools or you do this work with public health teams in X, Y and Z. Don't do that. Stop doing that'. And essentially to focus on doing a piece of research and writing. That has changed because now universities see the engagement as a big part of what they do. But a big part of that was a change in Research Assessment Exercise and impact. So the very people who said: 'Stop doing that', were the people who were knocking on my door when they realised they needed impact cases. So I think that there is now an acknowledgement or in fact an imperative or need for people in academia to engage in different activities and that engagement and impact are now recognised as much more legitimate activity. (Fuse 2)

As outlined in the quote above, the integration models do not replace the separation models, but rather the proportion of projects carried out in accordance with the logic of impact seems to increase (akin to the concept of "practice selection" by Berman, 2012b). As a result, the practices guided by this logic of impact entered the mainstream. And importantly, as highlighted in Chapter 2 Section 2.4, the move towards the research impact agenda and the way it was institutionalised was not an inevitable outcome of unstoppable progress, but rather it was shaped by specific sets

of decisions made by the government and the research funders (Pestre, 2003). Therefore, the research impact agenda should be seen not as a paradigmatic change in the understanding of science (for example in terms of one mode of science replacing another), but rather as a layered institutional change. Consequently, the research impact agenda increased the pluralism of the institutional environment which is becoming multi-paradigmatic.

8.5. CONTRIBUTIONS TO PRACTICE

This thesis is situated in the context of the two specific organisations. As highlighted in Chapter 4, the design of the study, guided by the interpretivist and constructivist approach, was not meant to produce generalisability on the broader "population" of organisations and academics. The findings are therefore situated, but nevertheless can point to important observations about the relationship between science and policy. This chapter has focused thus far on synthesising the findings and presenting theoretical insights into the legitimacy and effectiveness of science, as well as introducing a symbiotic model of the science-policy relationship, understood as a scale between separation and integration. The design of this study was aimed mostly at providing theoretical insights into the field of knowledge exchange and research impact (for example due to its case study design). However, this work also offers some insights into ways in which these theoretical findings might be translated into practice.

The first key area which might offer insights into the development and assessment of knowledge exchange is the way impact is defined and measured. One of the key insights stemming from Chapter 7 was the introduction of the notion of "processual impact" – impact on the way policymakers and practitioners carry out their work, even after the knowledge exchange projects have been finalised. This type of impact goes beyond specific projects or even substantive policy areas. For example, Chapter 7 discussed a practitioner who recalled that the most important outcome of working with Fuse went further than just directly translating the research funding into decisions (as the considerations involved have to go beyond purely academic arguments and include the political will of local councils or economic factors). Instead the biggest change was a change in the ways they carry out the subsequent projects, including planning for

evaluation from the beginning, or assessing different programmes in terms of their health impacts. This type of impact is arguably difficult to measure, but is central to knowledge exchange, as it assumes a long-term change. The current ways in which "research impact" is assessed in the UK academic system (discussed in Chapter 2) ignores this form of change, due to the strong presumed links between research and outcomes.

However, this thesis shows that looking at policy impact in terms of practice rather than purely cognitive processes unveils an important limitation. Research-based (or informed) changes in policy and practice do not stem only from the epistemic content of evidence but also result from various practices that enable evidence use (for example planning evaluations). Capturing and incentivising this type of impact might not only lead to more holistic assessment of academic engagement with policy and practice but also could potentially help to overcome an important limitation of the impact agenda – its propensity to focus overwhelmingly on instrumental impact, with the risk of narrowing down the forms of engagement between academic and non-academic actors (Greenhalgh & Fahy, 2015; Meagher & Martin, 2017; Smith & Stewart, 2017a).

This point leads to the second theoretical insight, with practical implications that might be derived from this thesis. As highlighted time and again – both by the interviewed academics and in the broader literature (see: Chapter 3 Section 3.4) – the evidence on its own rarely leads to policy changes, as making policy decisions involves multiple factors. And evidence is only one of many considerations (Hawkins & Parkhurst, 2015). At the same time, the findings presented in Chapter 6 and 7 indicate that this complexity of policymaking does not deem the academics completely devoid of agency in their efforts to try to achieve policy and practice change. One way they could do it is by prompting the changes in practice discussed in the preceding paragraph. Another way is by shaping the frameworks of interaction between academics and policymakers. As argued in Chapter 7, policymakers and practitioners mirrored the framings used by the academics. For example, policymakers and practitioners working with Fuse saw the interaction as a co-production, whereas those working with the Genomics Forum saw it as broadening of their perspective and mutual learning. And

these framings translated into types of impact that could have been achieved. This consideration might provide guidance on multiple institutional levels, both organisational and institutional. Moving towards incentivising utilitarian forms of engagement – namely those that lead to instrumental changes – might affect academic practices, as academics will employ strategies that are aimed at producing these types of impact. This might be detrimental to the long-term quality of engagement between science and policy, as interviewees working with both organisations highlighted that having spaces for broad, unfocused debate is important and might lead to impacts in the long-term.

Finally, the third group of practical insights stemming from the research presented in this thesis has to do with the interactions between academic, "excellent" research and policy-oriented research and impact. In particular, the findings stemming from this research indicate that any forms of "dividing labour" between impact and traditional research are potentially problematic, particularly for the academics involved in such initiatives. This idea seems to be gaining a lot of traction in academic circles, as seen in the proposal for a form of "division of labour" in academia, whereby some academics could focus on traditional academic work and others would explore impact. An example is the following quote from an academic collaborating with the Genomics Forum:

> REF was based, and still is based, primarily, on number of academic publications in high-ranking journals. They say that impact is taken into account, and yet there are these impact case studies. But the universities still give 80% of their priority to the high level impact in academic referee journals. […] What we need to do is make the impact be 50% of the REF outcome, not 20%, and for individual academics to be able to focus themselves 100% on impact, or maybe 80% on impact, 20% on academic journals, so that everybody is not expected to be 20% on impact and 80% on hard and fast academic outcomes[33]. (GF 8)

The logic of division of labour seemed to underpin the establishment of the Genomics Forum, as the organisation was charged solely with knowledge exchange and public

[33] It should be noted that this interviewee seems to be referring to the weight of different elements of the submission, rather than economic value assigned to specific elements since the impact case studies are linked to considerable monetary value (Reed & Kerridge, n.d.). Furthermore, the weight of the impact element will increase to 25% in the next round of REF, see: HEFCE, 2017.

engagement and was not formally expected to conduct primary research. And the experiences of academics collaborating with Fuse and the Genomics Forum seem to indicate that, in reality, such division of labour would be difficult to implement, because of the way the academic incentive system currently works. Therefore, any method for dividing the labour between research and impact would be detrimental to academics engaged in impact work, whose academic standing might be at risk. As argued in Chapter 5, academic work validates impact work; therefore, separation of the two would disadvantage academics because they would have to work overtime to publish or risk disadvantaging their careers. Therefore, a clear implication for practice would be to set up organisations or funding schemes in a way that would allow for flexibility between these two types of practices. At the same time, as seen in Chapter 6, the cultural norms of what constitutes a legitimate "academic" activity are changing and the academics reported different career impacts between 2004 and 2017. Therefore, the division of labour might still be a possible strategy in the future (however only provided that the institutional incentive structure changes).

8.6. CONCLUSIONS

This chapter has synthesised the findings explored throughout this thesis to offer a theoretical reflection on the relationship between science and policy. The chapter introduced the concept of a symbiotic relationship between science and policy, as one in which these two spheres are simultaneously integrated and separated. The relationship between separation and integration is not static, and could be understood as a scale on which the proportions between the two vary, depending on the policy context, dominant science funding paradigm, disciplinary characteristics or individual preferences of actors conducting knowledge exchange.

The symbiotic model of the science-policy relationship is supported by two theoretical insights: firstly, it is highlighted that cartographic metaphors of the science-policy relationship, despite being useful in capturing its malleable, socially constructed nature, fall short of capturing situations where actors and practices are part of two worlds at the same time. Secondly, the legitimacy of knowledge exchange is based on

conforming to both separation and integration models in the eyes of both academic and policy/practice audiences.

Additionally, the symbiotic model further explains the change between the two models of knowledge production. As argued in this chapter, this change was not paradigmatic – as it did not occur in the form of one logic replacing another, but rather as a process of blending of two institutional logics in a form that would gradually increase the levels of integrational logic.

Finally, this chapter has outlined some key contributions to practice that might stem from this thesis, in particular the influence of the set-up of knowledge exchange organisations and projects on the types of impacts that are being achieved and the desirability of implementing "division of labour" models for navigating integration and separation models in practice.

CHAPTER 9

CONCLUSIONS

9.1. INTRODUCTION

How do academics reconcile the expectations of objectivity and relevance within interactions with policymakers? This question – and a starting point of this PhD thesis – is central not only to the ever-changing research funding landscape but also to the broader understanding of expertise in the contemporary world. As academics are increasingly expected to engage with their social and political environment in order to produce research impact, the sources of their authority and perceptions of their value inevitably evolve. This thesis has investigated this problem by exploring the knowledge exchange work of two organisations – the Genomics Forum and Fuse. The tension between different manifestations of autonomy and engagement discussed throughout this thesis has enabled some important observations about the nature of academic work, its value and authority, as well as its institutional determinants. In this concluding chapter I summarise these insights by firstly presenting a brief overview of the key empirical findings discussed in the thesis, and secondly offering some final reflections on the contributions this thesis has made to the understanding of science and policy. This chapter – and the thesis – conclude by proposing a future research agenda.

9.2. AN OVERVIEW OF THE EMPIRICAL CONTRIBUTIONS OF THE THESIS

The conceptual underpinnings for this thesis (as outlined in Chapters 1-3) have discussed expertise as an encultured and institutionally determined phenomenon, shaped by two diverse models of the science-policy relationship: integration and separation. Accordingly, any exploration of expert work in policy would be incomplete without an inquiry into the academic institutions that shape academic knowledge production and exchange. A key institutional change occurring in the UK over the last two decades has been the introduction of a research impact agenda. By engaging in an analysis of the content of key strategic research funding documents, contrasted with the lived experiences of academics conducting knowledge exchange work, this thesis

argued that the influence of the research impact agenda goes beyond changing the ways in which research is funded. Instead, it has led to the development of a new institutional logic in academia, which I termed the "logic of impact". This new logic emerged to co-exist with the traditional scientific logic (which I termed the "logic of excellence") and at times to compete with it. Nevertheless, institutional logics merely offer a repertoire, a blueprint for action, and therefore could be interpreted in various ways by the actors on the ground (Binder, 2007; Swidler, 1986; Weber et al., 2013).

This notion of the interpretation of the logic of impact in practice was the focal point of the empirical exploration of the meanings and practices of academics involved in knowledge exchange in the two case study organisations. The key empirical contributions of this thesis were discussed in Chapters 5 to 7, which explored three main areas: practices of academics involved in knowledge exchange (Chapter 5), framings of knowledge exchange (Chapter 6), boundaries between science and policy/practice (Chapter 7).

This thesis further identified three types of knowledge practices, varying in their epistemic contents:

1. producing academic research
2. translating research
3. producing policy-oriented research

In order to maintain academic standing while still being responsive to policy needs, the interviewees had to combine all three types of practices. For this purpose, academics had to develop approaches to establishing a hybrid academic practice, either by separating different types of practices or trying to integrate them within one project (which was perceived as being more challenging and requiring significant effort).

These practices were guided by framings of knowledge exchange (explored in Chapter 6). The key empirical insight here comprised four understandings of knowledge exchange, understood as: challenging, learning, providing actionable knowledge, and advocating.

These framings differed across two dimensions:

1. the level of abstraction of the envisioned output: aimed at either knowledge (framings, understandings, ideas) or aimed at practice (decisions, regulation, policies);
2. the form of interaction with the research base: either facilitating social knowledge production and uptake or representing research findings.

Engagement with non-academic audiences, Chapter 6 observed, might be carried out from multiple epistemic or cultural and institutional standpoints – either based on the logic of impact or the logic of excellence.

At the same time, as argued in Chapter 7, these standpoints are not universally shared amongst academics or policymakers. Rather, this empirical setting is highly fragmented by multiple different epistemic and organisational boundaries. Academics associated with knowledge exchange organisations had two approaches to managing the boundaries:

1. boundary blurring (by creating hybrid spaces in which shared practices could be developed);
2. boundary setting (where new areas of knowledge were set up to legitimately co-exist with policy).

The boundary between science and policy/practice, as perceived by the interviewees, was both malleable – allowing for a development of multiple strategies and approaches, and stable – inasmuch as, once an approach was established and deemed credible and legitimate, it appeared to settle and began to be mirrored by policymakers and practitioners. For example, research users working with the Genomics Forum saw knowledge exchange as a learning and challenging activity, whereas Fuse's partners saw it as a co-production of actionable evidence.

9.3. THEORETICAL AND CONCEPTUAL CONTRIBUTIONS

By looking at these empirically rich cases of academics "inhabiting" (Hallett & Ventresca, 2006) academic institutions, this thesis has made important contributions

to the understanding of the science and policy relationship. The in-depth interpretivist exploration of meanings and practices summarised in the preceding section has offered important insights into the notions of academic authority and the value of science in society (which were addressed in the discussion in Chapter 8). Most notable were three contributions of particular importance:

Firstly, by exploring the symbiotic model of the science-policy relationship, this thesis offered an insight into the persistent duality between integration and separation as a grounding of academic authority. Therefore, the authority of science is no longer based on the separation model and autonomy from the setting; but nor is it completely grounded on social embeddedness. Instead it requires a constant navigation between the two modes.

Secondly, the process of balancing separation and integration of science and policy entailed navigating various institutional processes which legitimised different practices (for example, producing research that was applicable to problem-solving while being academically excellent). In order to adapt these contradictory expectations, the academics employed various rhetorical strategies, conceptually stretching the meanings of diverse concepts and practices, such as impartiality of autonomy, to appropriate them to the changing institutional processes.

Thirdly, even though this emergent model of the authority of science is portable – allowing science to travel across different institutional settings without compromising its epistemic achievements (Jasanoff, 2004; Star & Griesemer, 1989), there are limits to this portability. On the academic side, the portability of the symbiotic model of the authority of experts was bounded by the legitimising dynamics of different academic practices (therefore of the expectations of excellence). On the policymaking side, it was confined by the perception of the "politics" of the policymaking process, to which academics had no access.

These insights are of particular importance not only because they point to the malleable and portable understanding of academic authority, but also because they open up new areas of research on knowledge, experts and policy, as discussed in the concluding section.

9.4. AGENDA FOR FUTURE RESEARCH

The preceding sections have highlighted a number of potentially fruitful conceptual and empirical contributions which the thesis offers to the broader literature on science-policy interactions. Further consideration of the methodological and conceptual approach employed in this thesis (Chapter 4 Section 4.8) opens up new lines of future research that might build on the work presented in this thesis.

The first potential area of inquiry relates to the symbiotic model itself. The work on this concept might be advanced by applying it to other areas of inquiry. Exploring it in the comparative context of polarised and highly political policy problems and more technocratic or consensus driven ones could offer further insights into the way policy and science are both separated and integrated. Furthermore, such science and policy controversies might be particularly fruitful for exploration of the symbiotic models, as they have been described in the literature as potentially inviting both integration and separation (for example climate change: Sundqvist et al., 2017). Therefore, a cross-case comparison between multiple areas of controversy, such as climate change, gene editing (CRISPR), legalisation of marijuana, gun violence, or vaccinations might offer further in-depth insights into the scale between complete integration and separation

The further three areas of inquiry are directly linked with knowledge exchange. The first area of future research building on this study relates to the finding presented in Chapter 7 considering the research users (policymakers, advisers, practitioners) drawing boundaries around different elements of the policymaking process as political (e.g. considering budgetary constraints or local politics) and outside the scope of academics' work. This finding could be further explored by studying it more extensively from a policymaker's perspective. The issue of knowledge translation between different levels of "research users" (e.g. across organisations or across levels of policymaking) might open up a potentially fruitful area of inquiry in terms of the way academic ideas get politicised in the process of translation and what kinds of legitimating practices are involved (considering the complex institutional environment of the organisations).

The second area of knowledge exchange research building on this thesis is processual impact. This novel form of impact might be explored from different disciplinary and

organisational angles. Expanding the empirical work exploring processual impact might also lead to further problematisation of, and analytical insights into, the relationship between more epistemically oriented impacts (instrumental, conceptual, symbolic) and processual impact, as well as insight into its measurement. This line of inquiry could be of relevance to research funders and regulators, particularly in terms of conceptually expanding the understanding of impacts that develop slowly over time within the so-called research impact agenda.

The third area of exploration of knowledge exchange has to do with the boundary organisations. The symbiotic model in general, together with the four-streamed legitimacy concept and the bounded portability of academic authority, might offer an interesting analytical framework for boundary organisations of different types, for example research institutes, think-tanks or even research councils. By employing these insights, such issues as contradictory expectations placed on the boundary organisations or their politicisation might be explained from a novel analytical standpoint.

These emerging areas of research point to the value of the insights discussed in this thesis, which not only goes beyond their analytical significance, but also highlights their importance for practical application. The issues of the value of expertise and the public accountability of experts in contemporary societies are becoming increasingly central to both academic and public debates. On the one hand, the research impact agenda seems to be a progressively growing international phenomenon (Gunn & Mintrom, 2016; Williams & Grant, 2018). On the other hand, the value and role of research knowledge is continuously contested (Perl et al., 2018; Speed & Mannion, 2017). In this ever-changing context, the in-depth exploration of the inherent duality of academic work in policy, and – in particular – the limits to expert authority, might serve both as a cautionary tale to research funders striving for increased relevance of science in policy, and also as encouragement to academics working in knowledge exchange. After all, this thesis has shown that academics are not only agents of change of institutional paradigms but also have the agency to shape the new institutional logic of impact in accordance with their own values and meanings

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Appendix 1
Information sheet and a consent form

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PARTICIPANT INFORMATION SHEET

PROJECT TITLE: KNOWLEDGE EXCHANGE ORGANISATIONS AND THE RESEARCH IMPACT ON POLICY

INVITATION

You are being asked to take part in a research study on knowledge exchange organisations, especially their mode of actions and impacts on policy and practice. The given research project aims to explore the variety of knowledge exchange processes as well as the roles intermediary organisations play in exchange and translation of knowledge. The research questions are exploratory and aim at understanding the process of achieving impact by university-located organisations, rather than in any way trying to evaluate their knowledge exchange activities or outcomes.

The study is a part of a PhD project in Science and Technology Studies at the University of Edinburgh. The project is conducted by **Justyna Bandola-Gill** and supervised by **Prof Catherine Lyall** and **Dr Katherine Smith.**

WHAT WILL HAPPEN

In this study, you will be asked to describe your experiences working in the intermediary organisation, particularly the stakeholders of your organisations,

different projects conducted by your organisation and their impacts. The interview usually takes about 60 minutes and is recorded.

BENEFITS AND RISKS

There are no known benefits or risks for you in this study.

COST, REIMBURSEMENT AND COMPENSATION

Your participation in this study is voluntary.

PARTICIPANTS' RIGHTS

You may decide to stop being a part of the research study at any time without explanation. You have the right to ask that any data you have supplied to that point be withdrawn/destroyed.

You have the right to omit or refuse to answer or respond to any question that is asked of you.

If you have any questions as a result of reading this information sheet, you should ask the researcher before the interview begins.

CONFIDENTIALITY/ANONYMITY

The data I collect do not contain any personal information about you (for example your name or the position you hold in the organisation). However, the study will include the name of your organisation, so you might be identifiable based on this information.

I may share transcripts or parts thereof with supervisors on a confidential basis to allow for academic oversight.

You have the right to review and remove parts of your transcript.

DATA STORAGE

Data collected during the interview will be stored on a secure server and will be password protected. I will store data for at least the duration of my PhD study.

FOR FURTHER INFORMATION

I, **Justyna Bandola-Gill,** will be glad to answer your questions about this study at any time. You may contact me at **Justyna.Bandola-Gill@ed.ac.uk.** If you want to find out about the final results of this study, please email me.

If you have any questions or comments about the conduct of this research please feel free to contact **Prof Catherine Lyall (C.Lyall@ed.ac.uk)** or **Dr Katherine Smith (Katherine.Smith@ed.ac.uk).**

INFORMED CONSENT FORM

PROJECT TITLE: KNOWLEDGE EXCHANGE ORGANISATIONS AND THE RESEARCH IMPACT ON POLICY

PROJECT SUMMARY: The research project aims to explore the variety of knowledge exchange processes and the roles intermediary organisations play in exchange and translation of knowledge. The research questions are exploratory and aim at understanding the process of achieving impact by university-located organisations, rather than in any way trying to evaluate their knowledge exchange activities or outcomes.

By signing below, you are agreeing that:

(1) you have read and understood the Participant Information Sheet,

(2) questions about your participation in this study have been answered satisfactorily,

(3) you are taking part in this research study voluntarily (without coercion),

(4) you are agreeing to being recorded during the interview,

(5) you understand that quotes from this interview might be used in a thesis or publications; your name will not be used but your organisation will be named,

(6) you understand that you might review or remove parts of your transcript.

Participant's signature Researcher's signature

Appendix 2
The interview schedule

INTERVIEW SCHEDULE

Introduction:

As I mentioned in my e-mail, I am conducting research for my PhD project on intermediary organisations in the higher education sector.

I would like to ask you some questions about your time at Fuse/Genomics Forum, different strategies used by Fuse/Genomics Forum to impact on policy, as well as the relationship between Fuse and its audiences.

This interview should take about 1 hour. I would like to ask you for permission to audio-record this interview.

GENERAL/INTORDUCTION ~ 1 min in

1. **Could you tell me about your work experience in Fuse/Genomics Forum?**
    a. What was your role in the organisation? What kind of work did you do?
    b. How did you end up working for Fuse/Genomics Forum? What were your expectations/hopes for Fuse/GF?
    c. How would you describe your institutional affiliation?
    d. What is the proportion of your workload dedicated to producing new research and conducting knowledge exchange/knowledge translation activities?
    e. How does Fuse/GF fit into your career trajectory? How would you describe the impact of Fuse/GF on your career?

PERCEPTION ON FUSE ~10 mins in

2. **Could you tell me in general terms about Fuse/GF?**

a. Why do you think Fuse/GF were established? What do you think are the expectations from Fuse/GF?

b. What are, in your view, the goals of Fuse/GF?

c. From your perspective, what was the Fuse's/GF's biggest achievement?

d. What could have worked better?

e. How do you think Fuse/GF changed over time? What, in your view, was the main driver of the change?

MECHANISMS ~20 mins in

3. **How would you describe Fuse approach/strategy to realising its goals?**

    a. If you were to name few projects that, in your opinion, illustrate Fuse's/GF's approach, what would they be?
    b. What role do you think your project/the project you were involved in played in realising these goals? **(if a project was mentioned)**

4. **Who are Fuse's key audiences? Why do you perceive them as important?**

    a. Who, in your view, is the biggest beneficiary of Fuse/GF's?

    b. What in your view are expectations of different audiences from Fuse/GF?

5. **<u>For the respondents doing KE</u>: What are the barriers and enablers of your work?**

6. **How do you use the research in Fuse's/GF projects?**

    a. What types of research do you use in the Fuse's activities?

    b. Can you give an example of research findings that you used in your work?

    c. How were these findings transformed/translated (if at all)?

    d. Do you think your research conducted as a part of the Fuse was relevant to policy? If so, did you, or others involved at the Fuse, make any efforts to link it to policy?

POLICY ADVISING ~35 mins in

7. **What is, in your perception, the policy-related work that Fuse/GF has done (if any)?**

IF YES:

8. **What do you feel Fus/GFe can offer policymakers? How would you describe the "product" Fuse/GF is offering to policymakers?**
9. What, if anything, do you think was significant/unique/new about the advice the Fuse/GF could offer to policymakers (e.g. compared to other advisory entities in the policymaking spectrum or standard cooperation with the researchers)?

LOCATION AT THE UNIVERSITY ~40 mins

10. **What is your perception of the relationship between Fuse/GF and the universities involved? How do you think the location at the universities impacted Fuse's/GF's work (if at all)?**
    a. Why do you think Fuse/GF designed as a university-based organisation?
    b. **How, in your opinion, did academics outside Fuse/GF perceive it?**
    c. In recent years, various changes mean academics are increasingly expected to engage with different stakeholder groups, beyond academia. Do you think there is anything special/different about the organisations like Fuse, compared to individual academics trying to achieve impact of their research today? Might something be learned from Fuse's /GF's experience about effective ways to engage?
    d. Do you think learning from the experience of Fuse/GF is sufficiently captured?

POLITICS ~50 mins in

11. **How did you perceive the relationship between Fuse/GF and its funders?**
12. **What do you understand as "the impact agenda"? What is your perception of it?**

a. Do you think the 'impact agenda' seems to be changing over time? If so, how?

b. Do you perceive any changes in the way the goals/expectations of the impact agenda have been formulated across the years?

c. What factors do you think are driving the impact agenda?

d. Do you think the introduction of REF has changed the way Fuse/GF is operating?

13. What, in your opinion, is the role of the Universities in the society/policy?

a. How, in your opinion, should a relationship between the researchers and policymakers work?

b. What, in your opinion, are the problems with the uptake of research in policymaking process?

c. Do you think the existence of organisations such as Fus/GFe change the relationship between policy and academia?

CLOSURE

These are all the questions I have for you today. We seem to have covered a great deal of ground and I would like to thank you again for your time and patience. Before we conclude I was wondering whether you think there's anything we've missed out.

1. Do you have any other comments about what we have discussed, or about the research as a whole?
2. Is there anybody in your opinion I should interview?
3. Are there any documents that I should see/analyse?
4. Would you like to see the transcript of your interview?

Appendix 3
Research protocol sent to interviewees in Fuse

RESEARCH PROTOCOL

Knowledge Exchange Organisations and the Research Impact on Policy

1. INTRODUCTION

1.1. The context of the study

The relationship between research and policy in the UK in recent decades has been impacted on by two trends: (1) the calls from policymakers to achieve evidence-based policy (e.g. Cabinet Office, 1999, 2000) and (2) the pressure from academics to produce a "useable science" (Ingold & Gschwend, 2014). One of the interventions aimed at answering these calls was the introduction of impact as an assessment criterion for funding schemes by the research councils (e.g. ESRC 2015; RCUK 2007) and the Research Excellence Framework (REF, 2011).

This turn in science policy has resulted in funding of multiple impact-oriented initiatives. One of them involves knowledge brokers, that is, dedicated posts or organisations that "can and do facilitate impact on behalf of individual researchers who would not otherwise have access to the necessary resources and infrastructure" (ESRC, 2009).

1.2. The existing literature on knowledge brokerage

1. The term "knowledge broker" is not clearly defined and is often used interchangeably with other terms (e.g. intermediaries, mediators, research liaisons, etc.) (e.g. Jacobson et al., 2003; Honig, 2004; Osborne, 2004; Ward et al., 2009).
2. The literature describes knowledge brokers as disseminators of evidence, presenting policymakers with different, research-based recommendations. The concept thus framed might be seen as making it possible for academics to get involved in the policymaking process without losing their impartiality (e.g. Bednarek et al., 2015; Pielke, 2007; Meyer, 2010).
3. Knowledge brokers are bridges between policy and research; their main areas of activity involve disseminating information and translating research, connecting different actors and facilitating relationships (e.g. Reinecke, 2015; Sin, 2008; Ward et al., 2009; Wesselink et al., 2013).

2. THE GOALS OF THE STUDY

The research questions are exploratory and aim at understanding the process of achieving impact by university-located organisations, rather than in any way trying to evaluate their KE activities or outcomes. The study has four main goals:

1. To identify the core mechanisms through which knowledge brokers operate.
2. To explore how different actors (knowledge brokers, researchers, policymakers, etc.) perceive and experience the impact agenda and knowledge brokerage roles.
3. To explore the assumptions of different actors regarding knowledge brokerage and the impact agenda.
4. To explore the relationship between the funding bodies' ideas about the impact and everyday practice of the research impact work.

3. METHODS

The research design of the project comprises a comparative case study of a number of RCUK-funded knowledge exchange organisations located at or linked to UK universities. The data collection strategy involves document analysis and interviews. Since the goals of the project require a focus on people working in these organisations, as well as on the organisations' projects, I decided to structure the data collection as a two-stage process. The first stage would be focused on the analysis of organisations themselves ("Organisational stage") and the second on the analysis of projects conducted by the organisations ("Case study stage").

3.1. Case selection

The study aims to identify mechanisms through which knowledge exchange organisations operate. To achieve this goal I will look at particular projects conducted by Fuse. The aim is to identify the cases that the participants perceive as illustrative or typical of the organisation's work. I will identify the representative cases (or tools) in the interviews and expand the analysis by looking at the related documents (discussed in detail in section 3.3.).

3.2. Semi-structured interviews

3.2.1. Selection of the interviewees

The interviewees will be selected according to the "maximum variation" rationale (Seidman, 2006) to ensure access to different standpoints, based, for example, on:

- the institutional affiliation of the participant, particularly in terms of different universities being part of Fuse;
- the position held in the organisation;
- the time period of employment by the organisation;
- participation in different projects.

The initial list of potential interviewees was created by internet search. This list will be expanded by employing two strategies for the recruitment of participants: via gatekeepers and snowballing.

3.2.2.Interview guide

During the interviews I will employ an interview schedule to guide the conversation. The questions are on the following themes:

- Participant's role in the organisation;
- Participant's perception of the organisation (goals, achievements, overall strategy);
- Mechanisms through which the organisation operates (illustrative examples of projects, audiences, barriers and enablers, use of research);
- The approach to policy work;
- Relationship between the organisation and the university;
- Relationship between the organisation and its funders;
- Perceptions and experiences of impact roles and the impact agenda.

3.3. Document analysis

The second important source of data consists of documents. The documents will be identified through desk research (e.g. analysis of the website or the funding bodies' documents), during interviews, and through contact with gatekeepers. Examples of documents to be consulted include:

Organisation stage:

- Reports to funders or excerpts from the reports;
- Newsletters;
- Strategies (for example, Fuse Knowledge Exchange Impact & Collaboration Strategy).

Case study stage:

- Policy documents, policy briefs;
- Leaflets and booklets, event programmes, newsletters;
- Research summaries;
- Press clippings;
- Reports;
- Minutes of meetings.

The analysis will include publicly available documents. In the case of documents which would not be public (for example, meeting minutes or reports), I would consult Fuse's management as to the documents' content and analyse non-sensitive extracts from them.

3.4. Confidentiality (NOTE: subject to final agreement with Fuse's management)

The interviews will be conducted with the informed consent of participants. The interviewees' names and positions will be anonymised but the name of the organisation will not be. The interviewees will be informed that there may be a risk of being identified from the name of the organisation. The interviewees will be informed of their right to withdraw from the study and to review or remove parts of the transcript.

4. DISSEMINATING THE RESULTS

An important aspect of the research design would be learning from participants by disseminating the preliminary results. During the interviews I will ask participants what kind of feedback coming from my study would be most useful for them. At the end of a project I will create a policy brief-format report and disseminate it to participants. Additionally, I will present Fuse with the emerging themes, as well as final results of my research (for example during seminars or workshops).

Appendix 4
List of analysed documents

RESEARCH FUNDING DOCUMENTS

1. Cabinet Office Realising Our Potential: A Strategy for Science, Engineering and Technology 1993.
2. HEFCE Initial decisions on REF 202 2017.
3. HM Treasury Lambert Review of Business-University Collaboration. Final Report. 2003
4. HM Treasury Science and Innovation Investment Framework 2004-2014.
5. RCUK Increasing the Economic Impact of the Research Councils 2007.
6. RCUK. Progress in implementing the recommendation of the Warry Report on the economic impact of the Research Councils 2008.
7. REF Research Excellence Framework: Second consultation on the assessment and funding of research 2009.
8. REF Research Excellence Framework: Assessment framework and guidance on submissions 2011.
9. Building on Success and Learning from Experience. An Independent Review of the Research Excellence Framework, Stern Review 2016.
10. Increasing the economic impact of Research Councils Peter Warry2006.
11. ESRC Taking Stock. A Summary of ESRC's Work to Evaluate the Impact of Research on Policy & Practice 2009.
12. ESRC Cultivating Connections: Innovation and Consolidation in the ESRC's Impact Evaluation Programme 2013.
13. ESRC Annual Report 2002-2003.
14. ESRC Annual Report 2003-2004.
15. ESRC Annual Report 2004-2005.
16. ESRC Annual Report 2005-2006.
17. ESRC Annual Report 2006-2007.
18. ESRC Annual Report 2007-2008.
19. ESRC Annual Report 2009-2010.
20. ESRC Annual Report 2010-2011.
21. ESRC Annual Report 2011-2012.
22. ESRC Annual Report 2012-2013.
23. ESRC Annual Report 2013-2014.
24. ESRC Annual Report 2014 – 2015.
25. ESRC Annual Report 2015 – 2016.
26. ESRC Annual Report 2016 – 2017.
27. ESRC Delivery Plan 2005.
28. ESRC Delivery Plan 2006.
29. ESRC Delivery Plan 2007-2008.
30. ESRC Delivery Plan 2008-2011.
31. ESRC Delivery Plan 2011-2015.
32. ESRC Delivery Plan 2016-2020.
33. ESRC Strategic Plan 2005-2010.
34. ESRC Strategic Plan 2009-2014.

35. ESRC Strategic Plan 2015.
36. ESRC Strategic Plan 2016-2020.
37. MRC Annual Report 2002-2003.
38. MRC Annual Report 2003-2004.
39. MRC Annual Report 2004-2005.
40. MRC Annual Report 2005-2006.
41. MRC Annual Report 2006-2007.
42. MRC Annual Report 2007-2008.
43. MRC Annual Report 2009-2010.
44. MRC Annual Report 2010-2011.
45. MRC Annual Report 2011-2012.
46. MRC Annual Report 2012-2013.
47. MRC Annual Report 2013-2014.
48. MRC Annual Report 2014 – 2015.
49. MRC Annual Report 2015 – 2016.
50. MRC Annual Report 2016 – 2017.
51. MRC Delivery Plan 2006.
52. MRC Delivery Plan 2007-2008.
53. MRC Delivery Plan 2008-2011.
54. MRC Delivery Plan 2011-2015.
55. MRC Delivery Plan 2016-2020.
56. MRC Strategic Plan 2005-2010.
57. MRC Strategic Plan 2009-2014.
58. MRC Strategic Plan 2015.
59. MRC Strategic Plan 2016-2020.

ORGANISATIONS' DOCUMENTS:

Documents provided by the organisations:

60. The Genomics Forum Application Form.
61. Response to ESRC Questions on the University of Edinburgh's Application for the ESRC Genomics Research Forum (EGRF).
62. The Genomics Forum Mid-Term Review.
63. The Genomics Forum Mid-Term Assessors' Review.
64. The Genomics Forum Response to the Mid-Term Review.
65. The ESRC Genomics Forum. Final Report.
66. ESRC Evaluation of the ESRC Genomics Network: Policy and Research Forum. Final Report.
67. Fuse Knowledge Exchange, Impact and Collaboration Strategy.
68. Fuse Application Form.
69. Fuse Renewal: Case for Support.
70. Extract from The Minutes of The UKCRC Public Health Research: Centres Of Excellence Interviews Held On 4th December 2007 At The Medical Research Council, London.
71. Fuse NIHR School For Public Health Research (NIHR SPHR)Application Form.
72. Fuse Case studies of sampled AskFuse enquiries.

73. Fuse List of sample of AskFuse inquiries.

Websites [including sub-pages on each page where relevant]

74. https://web.archive.org/web/20160527055445/http://www.genomicsnetwork.ac.uk/forum/
75. https://web.archive.org/web/20160830200331/http://genomicsnetwork.ac.uk/forum/research/775
76. https://web.archive.org/web/20160830175321/http://genomicsnetwork.ac.uk/forum/research/733
77. https://web.archive.org/web/20160831010201/http://genomicsnetwork.ac.uk/forum/research/2819
78. https://web.archive.org/web/20161108175411/http://www.genomicsnetwork.ac.uk/forum/bright-ideas/
79. https://web.archive.org/web/20160810065242/http://www.genomicsnetwork.ac.uk/forum/events/
80. https://web.archive.org/web/20160810065841/http://www.genomicsnetwork.ac.uk/forum/news/
81. http://www.fuse.ac.uk/aboutus/governance/
82. http://www.fuse.ac.uk/aboutus/fuselegacy/
83. http://www.fuse.ac.uk/research/briefs/
84. http://www.fuse.ac.uk/askfuse/howaskfuseworks/
85. http://www.fuse.ac.uk/askfuse/howwecanworkwithyou/
86. http://www.fuse.ac.uk/askfuse/outputs/
87. http://www.fuse.ac.uk/nihrsphr/

Appendix 5
Publications

Book chapter relating to the literature review presented in Chapter 3

Bandola-Gill, J., & Lyall, C. (2017). Knowledge brokers and policy advice in policy formulation. In M. Howlett & I. Mukherjee (Eds.), *Handbook of policy formulation* (pp. 249–265). Edward Elgar Publishing.

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15. Knowledge brokers and policy advice in policy formulation

Justyna Bandola-Gill and Catherine Lyall

INTRODUCTION: KNOWLEDGE BROKERS AND POLICYMAKING

The complexity of the policymaking process is generally acknowledged to have increased in recent decades; reasons often cited for this change include a constantly proliferating knowledge base (Owens, 2015; Pregernig, 2014; Wesselink et al., 2013) and the progressively multifaceted character of modern problems such as global environmental issues and the advent of new technologies (Spruijt et al., 2014). At the same time, policymakers are now under pressure to increase the use of research in policy formulation in the form of evidence-based or evidence-informed policy (for example, in the UK context: Cabinet Office, 1999). Consequently, there is now a greater need for more research-based bodies able to support policymakers in collecting and analysing this information (Knight & Lyall, 2013; Michaels, 2009; Owens, 2015, p. 2).

One type of entity that is presumed to facilitate the uptake of research in policy is the so-called knowledge broker (Choi, 2005; Hoppe, 2009; Sebba, 2013; Smith et al., 2013). The concept of knowledge brokerage stems from the private sector, where it has been linked to improved knowledge management, resulting in an increase in innovation within business enterprises (Howells, 2006; Roth, 2003; Ward et al., 2009). Knowledge brokerage has gained traction in recent years and is seen as a promising process for tackling 'wicked' problems given its problem-oriented and interdisciplinary approach (Hering, 2015). Knowledge brokerage can be performed both by individuals and by organizations (Hargadon, 1998; Ward et al., 2009), although some argue that in policymaking the brokerage function is performed more efficiently by organizations than by individuals since organizations offer the interdisciplinary expertise of different members. Additionally, the involvement of multiple participants in advisory bodies, for example, prevents such bodies from advocating for a specific policy solution (Pielke, 2007, pp. 17–18).

The need for research evidence, and consequently for knowledge brokers, can be observed at every stage of the policy process, from agenda setting (to clarify and identify issues and relevant knowledge, see Nutley et al., 2007, p. 93; Stone et al., 2001) to evaluation. However, knowledge brokers are especially useful for policy formulation as, at this stage, research can provide information on policy options and their possible outcomes (Nutley et al., 2007, p. 93; Stone et al., 2001). The nature of policy problems may change from the problem setting to implementation stages as problems become more concrete and the range of choices narrows. At later stages, it may no longer be possible to accommodate different alternatives (Turnhout et al., 2008). Therefore, the formulation stage allows knowledge brokers to focus on research-based alternatives to problems without necessarily advocating specific issues (Turnhout et al., 2008).

The purpose of this chapter is to take stock of the existing literature on knowledge brokers and their potential roles in policy formulation. Knowledge brokers are interdisciplinary phenomena that can be studied from multiple disciplinary standpoints. Scholars from different disciplines, most notably science and technology studies (STS) and political and policy studies, approach debates about knowledge brokerage (and, more broadly, about research in policy) from slightly different perspectives and rarely interact with each other to present a more comprehensive account of both knowledge production and policymaking (for example, Owens, 2015, p. 4). In this chapter we aim to bridge these two disciplinary traditions.

The chapter is organized as follows. We begin with a brief discussion of the challenge of defining a 'knowledge broker'. In order to understand the role of knowledge brokers in the process of creating policy alternatives and supporting decisions on a policy's course of action, we examine the different roles that research evidence might play in policymaking, as well as the different mechanisms through which research might enter the policymaking process. We then discuss the different brokerage strategies identified in the literature. Finally, we discuss how knowledge brokers' characteristics may increase their chances of influencing policy, and consider various problems with the assessment of knowledge brokers' influence.

Within the literature, the terms 'evidence', 'research' and 'knowledge' may be used somewhat interchangeably to describe what is being marshalled in order to shape policy. Others may use the term 'science' without necessarily distinguishing between 'natural' and 'social' science, as knowledge brokers might be seen to act across all disciplinary domains (for example, social science: Lightowler & Knight, 2013; environmental science: Reinecke, 2015; or health science: Traynor et al., 2014). In this chapter we focus on knowledge brokerage as an interdisciplinary activity, not limited to one disciplinary area (Hering, 2015; Phipps & Morton, 2013). However, given our institutional allegiance to science policy and STS, we draw some of our examples from these areas, specifically the practice of scientific advisory bodies in the policymaking process. We also tend to follow Nutley et al. (2007, p. 25) in talking broadly of 'research use'.

CAPTURING THE INVISIBLE: DIFFERENT APPROACHES TO DEFINING KNOWLEDGE BROKERS

The published literature offers multiple definitions of knowledge brokerage, and many studies and policy documents – and, indeed, even practitioners who identify themselves as knowledge brokers – use the term without specifying what they mean by it (Honig, 2004). The phenomenon is variously referred to as knowledge brokers (Jacobson et al., 2003), intermediaries (Honig, 2004), mediators (Osborne, 2004), boundary spanners, research navigators, research liaison officers, knowledge translators and research brokers (Ward et al., 2009). Usually the term 'knowledge broker' in the policy arena is used within the paradigm of knowledge exchange and mobilization and implies a two-way interchange between researchers and policymakers (Bielak et al., 2008; Sebba, 2013): knowledge brokerage is aimed at increasing awareness of research among policymakers and encouraging them to use existing research findings, but it is also targeted at encouraging researchers to conduct policy-relevant research (Van Kammen et al., 2006).

Table 15.1 Selected definitions of knowledge brokers

Term	Source	Definition
Intermediary	Honig (2004)	'Organizations that operate between policymakers and policy implementers to enable changes in roles and practices for both parties.' (p. 66)
Knowledge broker	Bielak et al. (2008)	'Intermediaries (knowledge brokers) link the producers and users of knowledge to strengthen the generation, dissemination and eventual use of that knowledge.' (p. 203)
	Lomas (2007)	'Knowledge brokerage links researchers and decision makers together, facilitating their interaction so that they are able to better understand each other's goals and professional culture, influence each other's work, forge new partnerships and use research-based evidence.' (p. 131)
	Nutley et al. (2007)	'Knowledge brokers mediate between research providers and research users by filtering and disseminating the findings from research.' (p. 63)
	Sin (2008)	'Brokers can be individuals or organisations that bridge the evidence and policy/practice divide.' (p. 86)
	Ward et al. (2009)	'Knowledge brokers act as intermediaries or linkage agents, using interpersonal contacts to stimulate knowledge exchange, the development of new research and the application of solutions.' (p. 271)
Mediator	Osborne (2004)	'This is the intellectual worker as enabler, fixer, catalyst and broker of ideas. Perhaps the salient feature, though, is the association of mediators with movement. The mediator is simply the one that gets things moving.' (p. 440)

It is not always clear if different terms indicate different types of activities or whether they are interchangeable (Knight & Lyall, 2013). Knowledge brokers are usually defined as intermediaries between knowledge producers and knowledge users (Bielak et al., 2008) or as actors bridging the worlds of research and policy (Lomas, 2007). According to Hering (2015, p. 2), knowledge brokerage is 'an iterative and bidirectional process of translation, tailoring of information for specific contexts, feedback and integrations'. A review of illustrative definitions is presented in Table 15.1.

Even though knowledge brokerage might be found in different areas of social life, policy is an area particularly conducive to this type of knowledge activity (Meyer, 2010). Examples of organizations performing knowledge brokerage roles in the policy advisory system include think tanks (Osborne, 2004; Sebba, 2013; Smith et al., 2013), advisory committees (Bijker et al., 2009; Kropp & Wagner, 2010; Owens, 2015) and advisory institutions with explicit knowledge brokerage goals (Reinecke, 2015).

The distinction between knowledge brokers and other policy intermediaries, such as government agencies or non-governmental organizations (NGOs), is often blurred. In this chapter we look at knowledge brokers as actors in the policy advisory system. In that sense, the term 'knowledge brokerage' might be more descriptive of what organizations *do*, rather than what they *are*. Advisory bodies might perform knowledge brokerage

roles simultaneously with other roles, for example, policy entrepreneurship or advocacy (Owens & Rayner, 1999). Therefore, not all advisory bodies are knowledge brokers, but many science advisory bodies do perform knowledge brokerage roles and we include these types of entities in our analysis. Knowledge brokers are usually portrayed as organisations that refrain from promoting one specific policy solution (Bednarek et al., 2015). This focus on disseminating knowledge, often in the form of research-based policy alternatives (for example, Pielke, 2007), is cited as a factor that differentiates knowledge brokerage from other activities, such as advocacy. However, in the increasingly competitive world of knowledge-based policy advisory systems, knowledge brokers may have to assume more active roles as 'marketers' of different ideas, in contrast to more passive forms of knowledge 'transfer' (Caswill & Lyall, 2013).

BETWEEN 'SCIENTIFICATION OF POLICY' AND 'POLICITIZATION OF SCIENCE': DIFFERENT USES OF EVIDENCE IN POLICYMAKING

It is not always easy to determine which elements of policy formulation are amenable to a research-based approach (Guston, 2001; Michaels, 2009). This leads to debates about the extent to which knowledge brokers can contribute to the process and what kind of impacts they could achieve. These debates are not purely theoretical, as the assumed model of the relationship between research and policy affects the possible scope of the impact of knowledge brokers and their roles in the policymaking process (for example, Owens, 2015; Pielke, 2007; Sprujit et al., 2014). A helpful way of making sense of the different roles that research-based advice (particularly in the realm of the natural sciences) might take in the policymaking process is presented by Owens (2015, pp. 6–13). The author categorizes four different approaches to conceptualizing the use of knowledge in policy:

1. Technical rationality – in which science advisors are objective, dispassionate experts and the process of advising is rational and linear.
2. Political rationality – in which science is used to legitimate political decisions, the process of advising is instrumental and political aims are superior to the knowledge base.
3. Cognitive perspectives – in which advisors are seen as facilitators of policy learning.
4. Co-production and boundary work – in which scientific advisors play a role in the mutual constitution of science and policy.

This categorization provides a clear account of the different perspectives on science in policy, as well as the roles that science advisors might play in the process. At the same time, the categories are not mutually exclusive, as the reality of research-based policy advice is not so clear-cut. For example, Owens argues that all four approaches can be observed even within one advisory body; in different contexts science advisors might play the role of impartial experts, legitimators of policymakers' decisions, facilitators of policy learning or agents of boundary work (Owens, 2015, pp. 16–17). Knowledge brokers are thus multifaceted phenomena and many different forms of knowledge brokerage co-exist.

In this chapter we look at these four conceptualizations in depth, recognizing that these different approaches aim to answer two separate questions: whether knowledge can have an impact on policy (technical and political rationality) and through which mechanisms this could occur (cognitive perspectives and co-production and boundary work). We organize the extensive literature on the role of research in policy formulation into two main areas: (1) different conceptualizations of evidence use in policy formulation; and (2) different mechanisms through which research enters the policymaking process. Knowledge brokers are relatively new actors in the policy landscape and most theories of policy change do not explicitly include such actors. We aim to shed light on this gap by introducing the concept of knowledge brokerage into selected existing theoretical approaches to policy change.

Range of Conceptualizations of Uses of Evidence in Policy

The evidence-based perspective on the policymaking process links research, implemented in a systematic way, with improved policies. This view of 'rationalised politics' (Jasanoff, 1990, pp. 1–2) permeates the public (and, to a more limited extent, academic) debate on different policy decisions. It is based on the assumption that there is an objective solution to policy problems that can be indicated by research (Macnaughton et al., 2013). Many authors oppose this linear and rationalistic perspective, however, by pointing out that scientific research, in a majority of cases, does not offer a solution to policy controversies. A popular explanation of this paradox (viz. declarations of increasing evidence use versus the reality of low research uptake in policy) is offered by the notion of an 'excess of objectivity' (Sarewitz, 2000; see also: Pielke, 2007, p. 62) – that is, a multiplicity of research findings can support conflicting positions. According to this view, research is used to legitimize pre-existing policy decisions (Grundmann & Stehr, 2012, p. 14). Correspondingly, the debate about the role of research in policy can be either overly critical (leading to an endless technical debate) or under-critical (with research being used instrumentally to justify pre-conceived decisions) (Collingridge & Reeve, 1986). As a consequence, the multiplicity of knowledge claims can then be used by different interest groups to ensure that decisions are open to political considerations, not just purely technical ones, such that 'Research on one hypothesis ought to cancel out research on others, enabling policy to be made which is insensitive to all scientific conjectures' (Collingridge & Reeve, 1986, p. 32).

Despite these pessimistic accounts, in reality, the use of research is evident in policy formulation (Bijker et al., 2009; Cherney et al., 2015; McNie, 2007; Owens, 2015). This contradiction might be explained by considering the use of evidence in policy as a spectrum of different possible applications of research. Nutley et al. (2007, p. 36) propose two general ways of thinking about the role that research plays in formulating policies: instrumental and conceptual. Instrumental use of research in policy formulation refers to the direct use of research in creating policy solutions. Conceptual use of research refers to the more indirect influence of research, both in creating a knowledge base for policymakers and in shaping policymakers' attitudes towards the issues. Nutley et al. (2007, p. 51) argue that research use might be conceptualized as a continuum, with raising awareness (an extremely conceptual use) at one end of the scale, and practice and policy change (an extremely instrumental use) at the other.

The origins of these two broad themes – of conceptual and instrumental uses of research in policy – can be found in the seminal work of Weiss (1979) who proposed six different meanings of research use in policy:

1. Knowledge-driven model, in which knowledge enters policymaking in a linear way (from basic research to applied research to development and application).
2. Problem-solving model, in which research is used to solve a particular policy problem based on recommendations derived from empirical evidence.
3. Interactive model, in which policy formulation is a result of non-linear and complex interactions between different stakeholders, such as policymakers, scientists, journalists and administrators.
4. Political model, in which research is used instrumentally to support pre-defined policy options.
5. Tactical model, in which ordering new research or waiting for new research results is used as a means of delaying policy action.
6. Enlightenment model, in which research has a long-term influence on the way policymakers think about problems, thus affecting the framing of issues and consequently leading to policy change.

Different Mechanisms through which Research Enters Policy

Policy learning

The debate over technocratic and instrumental uses of research in policy formulation focuses mostly on the use of research evidence as providing a basis – or lack thereof – for policy decision-making. However, there is another perspective on the science-policy relationship, which focuses on how research enters (or does not enter) the policy process. Heclo (1974), in his influential work on social politics in the UK and Sweden, has argued that the foundations of policymaking lie not only in the power of certain actors but also in the uncertainty that is inherent in any decision-making process: he views policymaking as a knowledge-intensive area and calls it a 'collective puzzlement' (Heclo, 1974, p. 305). According to this view, the policymaking process is a form of knowledge production in which learning occupies a central position. It is a group activity, where the interaction between different actors plays a crucial role.

Network approaches to policy learning and change take a similar view. Theories in this strand of literature include advocacy coalitions (Sabatier & Jenkins-Smith, 1993), epistemic communities (Haas, 1992), discourse coalitions (Fischer, 2003; Hajer, 1993), social learning (Hall, 1993) or communities of practice (Brown & Duguid, 2002). In this group of theories, actors involved in the process of policymaking include not only researchers and policymakers but also journalists, interest groups, think tanks, activists and industry representatives (Smith & Katikireddi, 2013). These networks of actors are not fragmented, since they merge around issues, beliefs and ideologies. In consequence, the differences between actors do not necessarily correspond to their organizational boundaries but rather to ideological positions on the issues (Smith & Katikireddi, 2013). While these theories do not address knowledge brokerage explicitly, we argue that they could be effective in explaining the work knowledge brokers do.

Knowledge brokers, as explained using the policy learning frameworks, might play

roles as facilitators of learning among multiple groups of actors. Their location on the periphery of social groups opens up opportunities for learning within but also across communities (Brown & Duguid, 2002; Freeman, 2006). The cognitive approach to policy advice helps to shed light on the limitations to the influence of research evidence on policy. For example, one of the most popular frameworks within this strand of literature, the Advocacy Coalition Framework (Sabatier & Jenkins-Smith, 1993), might help explain the limit to the uptake of research evidence in policymaking that is grounded in the distinction between different levels of hierarchical structure of beliefs (deep core, policy core and secondary core). The deep core is resistant to change, and evidence contradicting the deep core values would be ignored or dismissed by members of the coalition (Sabatier & Weible, 2007). Therefore, looking at knowledge brokers from this theoretical perspective suggests that knowledge brokers' activities might affect the strategies and tactics within coalitions, but have no impact on the deep core and policy core beliefs (Sabatier & Jenkins-Smith, 1993).

Boundary work

A second mechanism through which knowledge brokers may impact policy formulation involves boundary work and co-production of science and policy. The group of theories discussed in this subsection critiques a traditional view of the science-policy relationship, where science is an area of human activity that requires autonomy in order to provide socially useful knowledge (Jasanoff, 2003). The way research was utilized in practice was traditionally seen as a linear route from basic research through applied research to application and societal benefit, the so-called 'linear model' (for example, Jasanoff, 2003; Osborne, 2004; Pielke, 2007). This model has been widely criticized by authors who point out that knowledge production is a collective activity that takes place across different disciplines and areas of social life, and is not exclusive to research institutions. This view sees science as integrated with other social spheres, such as the cultural sphere or the state sphere, and as something that is 'co-produced' (Jasanoff, 2004, p. 2). Science therefore can be used in the policy arena because of its embodiment in society, rather than its autonomy, as the traditional model of the science-policy relationship would have it (Bijker et al., 2009, p. 151). This turn is reflected in multiple theories of knowledge production that have emerged in the last decades, for example, post-normal science (Funtowicz & Ravetz, 1993), Mode 2 knowledge production (Gibbons et al., 1994; Nowotny et al., 2001), and the Triple Helix (Etzkowitz & Leydesdorff, 2000).

Science and policy are demarcated not by objective characteristics, but by boundary work:

> The attribution of selected characteristics to the institution of science (i.e., to its practitioners, methods, stock of knowledge, values and work organization) for purposes of constructing a social boundary that distinguishes some intellectual activities as 'non-science.' (Gieryn, 1983, p. 782)

More recent accounts of boundary work perceive it not as a purely rhetorical strategy but also a material and structural one, which results in boundary work being seen as a three-level phenomenon, comprising discourses, practices, and organizational boundaries or arrangements (Bijker et al., 2009, pp. 145–6; Hoppe, 2009). In the case of scientific advisory bodies (Bijker et al., 2009, p. 146) they not only establish the boundaries (for

example, between science and policy, or between science and the advisory body itself) but also link and coordinate across these boundaries, for example, by selecting members who are experienced in both realms and act as translators. Therefore, boundary work includes not only the demarcation of a boundary between participants but also the coordination of relationships, by facilitating interaction among agents coming from different social settings (Hoppe, 2009).

Different types of boundary work can be adopted in different contexts. On the one hand, in less politically contentious cases, boundary work might take the form of a division of labour between scientists, policymakers and other players involved in the policymaking process (Turnhout et al., 2008). On the other hand, on more controversial issues, boundary work might be focused on delineating different knowledge coalitions and alignments of actors (Turnhout et al., 2008).

One of the ways in which a knowledge broker helps to navigate between boundaries is by producing 'boundary objects' that are located in between two social settings. Examples of boundary objects produced by knowledge brokers include conferences, reports and research summaries (McNie, 2007). Boundary objects are characterized by two main attributes: their flexibility, which makes it possible for actors from both sides of the boundary to use them for different purposes; but also by their robustness, which allows the objects to maintain their identity across these different settings (Star & Griesemer, 1989). Knowledge brokers may also be viewed as 'boundary organizations' (Guston, 2001). These organizations have three characteristics: they create boundary objects; they involve actors from different sides of the divide; and they are accountable to both of these worlds. Boundary organizations are able to provide resources to those on both sides of the boundary and maintain stability across the otherwise constantly changing boundary (Guston, 2001).

DIFFERENT STRATEGIES FOR KNOWLEDGE BROKERAGE

The preceding review of different theoretical approaches to knowledge into policy process clearly demonstrates that knowledge brokers can play different roles, depending on the underlying assumptions about the relationship between knowledge and policy. Part of the reason there is such a diversity of processes within knowledge brokerage is that there are very different views on why research is not often used in policy formulation. Knowledge brokers' strategies might be seen as ways of responding to these problems. Some approaches assume that the problems stem from insufficient communication and cultural barriers between the policy and science worlds (Lomas, 2000). Therefore, brokers could be effective by providing information or connecting different actors. Other approaches assume the problems are more complex, including the multiplicity of actors involved and the conflicting values and interests present in both knowledge production and policymaking (for example, Smith, 2013b). These approaches therefore support the view that brokers could be effective by encouraging co-production of knowledge by different groups of actors (including scientists and policymakers) and shared formulation of the framing of problems.

The key question this section aims to answer is: what work do knowledge brokers actually do? Various authors present different categorizations of knowledge brokerage roles (see, for example, Meyer, 2010; Reinecke, 2015; Sin, 2008; Ward et al., 2009; Wesselink

et al., 2013). We synthesized these categorizations based on the main focus of the activity and discovered that knowledge brokers' strategies consist of, broadly speaking, three groups of activities: strategies relating to information-sharing (focusing on moving information from science to policy); strategies relating to relationships (focusing on creating links and coordinating the relationship between different actors); and strategies relating to the creation of knowledge in a co-produced way. Each of these groups of strategies is explained in more detail below:

Information-oriented Strategies

This group of knowledge brokerage strategies involves managing the information coming from research, for example, by filtering and disseminating it (Nutley et al., 2007). Knowledge brokers are responsible for providing policymakers or practitioners with information or connecting them with relevant experts (Michaels, 2009). In order to do so, knowledge brokers need the capability to identify the knowledge needs of different actors (Reinecke, 2015).

Turnhout et al. (2013), in their categorization of what they call knowledge brokerage 'repertoires', introduce a distinction between 'passive' and 'integrative' approaches. Seen from this perspective, information-oriented strategies are the most passive of all knowledge brokerage activities, as they are focused on providing access to relevant research, for example, by writing and disseminating reports (Turnhout et al., 2013; Ward et al., 2009). The key role of knowledge brokers here is assuring that information is presented in a way that is understandable by the recipients (Michaels, 2009).

Relationship-oriented Strategies

The second group of knowledge brokerage strategies involves creating and supporting relationships between different groups of actors. This category of strategies might be summarized as combining 'know-how' with 'know-who' (as expressed, for example, by Meyer, 2010), as knowledge brokers seek to increase interpersonal contacts and communication between different actors (Ward et al., 2009; see also Lomas, 2000). The category is quite heterogeneous and might be better understood in terms of a spectrum: on one end, knowledge brokers simply create connections between different actors, and on the more active end, knowledge brokers play the role of translators, mediating research between different disciplines and engaging different actors (Michaels, 2009; Turnhout et al., 2013). Relationship-oriented strategies help develop trust between knowledge brokers, policymakers and scientists (Hering, 2015). Translation and mediation are integral processes, and make the process two-way (Sin, 2008; Turnhout et al., 2013).

As noted by Caswill and Lyall (2013), policymakers tend to see research as unfit for their needs in terms of language used, understanding of policy needs, scope of analysis and usability. Conversely, academic researchers working with policymakers are concerned that their academic freedom and the quality of their research will be negatively impacted by the increased integration of science and policymaking (Caswill & Lyall, 2013). Knowledge brokers, who are capable of synthesizing and translating research into more usable forms (Caswill & Lyall, 2013), can help solve these problems by increasing interaction between researchers and policymakers.

Co-production-oriented Strategies

The most integrative approach to the relationship between research and policymaking is found in the co-production-oriented group of strategies. This category of knowledge brokerage strategies includes activities aimed at producing relevant knowledge by different groups of actors and building capacities for accessing and applying knowledge (Michaels, 2009; Ward et al., 2009). In this group of strategies, knowledge brokers act not to 'link' actors located on different sides of the production/use divide but rather to blur the boundaries and serve as a partner to stakeholders (Turnhout et al., 2013), sometimes termed 'transdisciplinary research' (Lyall et al., 2015; Pohl, 2008). Knowledge brokers facilitate interactions between different actors, who together create frameworks of policy problems and formulate possible policy solutions (Michaels, 2009). One of the important aspects of knowledge brokers is their role as 'linguistic creators' (Meyer, 2010, p. 121) who are able to create a shared vocabulary, clarifying ambiguous terms and explaining how different sides use them (Michaels, 2009).

The particular strategy adopted by knowledge brokers depends on the context, including the type of issue at hand (Dobbins et al., 2009; Lomas, 2000; Ward et al., 2009). Michaels (2009) uses Turnhout et al.'s (2007) typology of policy problems to argue that the roles of knowledge brokers differ based on how the policy problems are structured, including the scale of agreement of different actors on the goals of the policy and the way of achieving it. Knowledge brokerage may consist of providing information (for well-structured problems, where actors agree on the goals and strategies of reaching these goals); facilitating a learning process (for unstructured problems, with high levels of scientific uncertainty about issues); managing dialogue between different actors in order to develop common concepts (for badly structured issues, with high levels of conflict of interest); or assessing arguments made by different sides of a conflict (for moderately structured issues, with conflicts around costs and benefits) (Michaels, 2009).

TRAITS EXHIBITED BY SUCCESSFUL KNOWLEDGE BROKERS

The most salient feature of knowledge brokers may be their 'double peripherality' (Meyer, 2010, p. 122) – their location on the periphery of both policy and science. In many contexts, this location is conducive to their activities, for example, by making translation and mediation possible. At the same time, their position may make them less visible in the policymaking process (Meagher & Lyall, 2013). This may, in turn, make it more challenging to gain sufficient authority and affect the perception of their expertise (Knight & Lightowler, 2010). Therefore, in order to make an impact on policy formulation, knowledge brokers require a certain set of qualities: the ability to analyse and transform research; expertise in both policymaking and knowledge production; the ability to establish links across different domains; and autonomy and authority.

Knowledge brokers operating in policy-related fields must be able to analyse and transform academic research, skills that are close (but not identical) to those held by scientists themselves. As noted by Turnhout et al. (2013), knowledge brokers increasingly produce research, as opposed to focusing solely on the results of such research. For instance, their role is to involve stakeholders in the research process and to communicate preliminary

results (Turnhout et al., 2013). An important aspect of this process is helping scientists and other stakeholders co-produce the research questions; this is often a challenging task of formulating mutual understanding of policymakers' needs in a way that is understandable and workable for scientists (Turnhout et al., 2013). Knowledge brokers should also have the ability to take a broad overview of the existing research (Clark & Kelly, 2005) and to connect existing research to policy problems in order to form possible solutions (Sverrisson, 2001).

Furthermore, in order to successfully support policy formulation, knowledge brokers ought to have expertise in areas related to both policymaking and knowledge production (Dobbins et al., 2009; Hering, 2015; Phipps & Morton, 2013). Lomas (2007) underlines the need to be entrepreneurial, and to have an advanced understanding of the different cultures of policy and science. In order to achieve this, knowledge brokers should be able to facilitate, mediate and negotiate, as well as to understand the process of learning (Lomas, 2007).

The third group of characteristics of knowledge brokers includes skills in establishing links across different domains (Meyer, 2010; Sverrisson, 2001). In order to do so, knowledge brokers usually have a broad network of connections or the ability to develop such a network (Traynor et al., 2014). Being 'networked' (by participating in different networks, as well as having connections to different policymaking bodies or even policy networks) allows knowledge brokers to better disseminate their ideas at different levels of government (Owens, 2015, pp. 154–7). Networks also support the two-way exchange between academic researchers and policymaking and allow for better assessment of the needs of both policymakers and knowledge producers.

Finally, in order to successfully support policy formulation, knowledge brokers ought to exhibit the characteristics assigned to them by other actors, such as autonomy and authority (Owens, 2015, p. 147) or credibility (Traynor et al., 2014). Authority and credibility are often a result of the boundary work described in the preceding section, and frequently stem from a framing of an institution as a 'scientific' body (Owens, 2015, p. 148) or by acknowledging an individual's research and policy background. Authority is closely related to autonomy, as the credibility of an advisory body is generated partially in terms of its independence, for example, financial independence or freedom of inquiry (Owens, 2015, p. 151).

INFLUENCE IN CONTEXT: MEASURING THE IMPACT OF KNOWLEDGE BROKERS

It is challenging (if not impossible) to ascertain the precise measurement or even definition of knowledge brokers' impact on policymaking (Bijker et al., 2009, p. 141). The influence of knowledge brokerage depends on the broader social, political, economic and empirical background (McNie, 2007; Michaels, 2009; Owens, 2015; Owens & Rayner, 1999). In most cases, a final policy decision cannot be traced back to one factor, but is instead the result of a multiplicity of different processes and interventions (Bednarek et al., 2015; McNie, 2007; Sarewitz & Pielke, 2007).

We have discussed in the third section of this chapter that research evidence can be used in multiple ways in the policymaking process (Nutley et al., 2007; Owens, 2015;

Weiss, 1979). However, not all of the situations where policymakers interact with research might be seen as 'influence'. For example, in their study of a scientific advisory body in the Netherlands, Bijker et al. (2009) found that the reach of advisory reports (measured by the numbers of copies sold or citations to the report in the literature and other policy documents) does not necessarily translate into policy decisions. Sometimes, knowledge brokers may influence the policy process by drawing attention to certain issues, before any recommendations are even made. The act of commissioning an advisory organization to conduct research or produce a summary report might influence policymakers by focusing their learning on formulating or reassessing arguments (Nutley et al., 2007, p. 34; Owens & Rayner, 1999). Owens and Rayner (1999) show that this type of learning occurs when the issues at hand occupy the periphery rather than the core of the policy.

The influence of knowledge brokers on policy formulation, therefore, cannot be separated from the circumstances in which the advice is given. Social and political contexts are often more important determinants of whether evidence can impact policy than the quality of the advice itself (Smith, 2013a, p. 23). One important contextual factor that might affect the likelihood of successful brokerage is that influence on policy is through continuity, particularly in terms of opening 'windows of opportunity' in the policymaking process (Hering, 2015). The critical importance of situations when policy advice is needed might be illustrated by the fact that sometimes knowledge brokers wait to share their proposed ideas for a policy solution until such windows are opened (Sebba, 2013; Stone et al., 2001).

Another factor affecting the work of knowledge brokers is the knowledge needs of policymakers. According to Liftin (1994), knowledge brokers are most useful where policymakers do not have sufficient time to commission original research or lack expertise in certain areas. Lövbrand (2007) argues that knowledge brokers have a chance of making an impact in situations where advisors have not made clear recommendations. According to some authors (e.g. Liftin, 1994; Michaels, 2009), knowledge brokerage might be useful in areas of high scientific uncertainty, as these areas require the ability to order and translate knowledge at which knowledge brokers excel.

Finally, the last set of circumstances in which knowledge brokers might be influential relates to the degree of development of policy. New areas of policy enquiry – ones that do not yet have an established policy core – offer more opportunity for knowledge brokers to be involved in policy formulation (Owens & Rayner, 1999). Additionally, there is an increased demand for academic research before and/or after major policy changes or in times of political crisis or contestation (Daviter, 2015; Michaels, 2009; Nutley et al., 2007, p. 76). Therefore, such contexts might open up opportunities for knowledge brokers. In these circumstances, research that resonates with other sources of evidence or advice would be more likely to be taken into account, in contrast to other forms of conflicting advice (Nutley et al., 2007, p. 76).

CONCLUSIONS

This chapter has taken stock of research on the roles that knowledge brokers play in policy formulation. Knowledge brokers, as facilitators of evidence uptake in policy, potentially play a role at every stage of the policymaking process. However, as their role

is usually related to proposing policy alternatives and assessing them in the light of the existing research base, they are likely to be most active in the policy formulation stage. Knowledge brokers are difficult both to define and to assess, as their activities are multi-faceted and highly context-dependent. But these same qualities make knowledge brokers particularly well suited to supporting the complex, interdisciplinary challenges of modern policymaking.

This chapter has identified three basic mechanisms through which knowledge brokers operate: information-related strategies, relationship-related strategies and co-production-related strategies. The activity undertaken will depend on the context of the policy problem and the underlying model of the policy-science relationship. In order to secure influence and bring clarity to Heclo's (1974, p. 305) process of 'collective puzzlement', knowledge brokers operating at the interface between research and policy therefore need to display a range of traits and be adept at selecting strategies appropriate for their situation. This leads us to the somewhat unsatisfactory conclusion that there is no one single model of knowledge brokerage that can guarantee success within the policymaking process.

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